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# FIG. 1

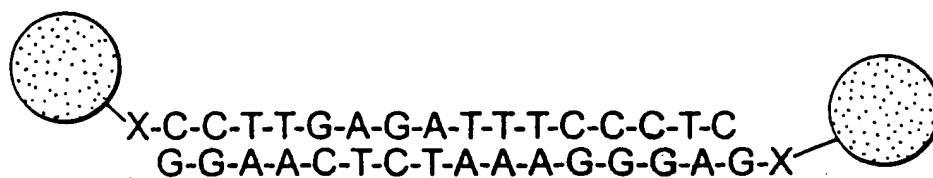
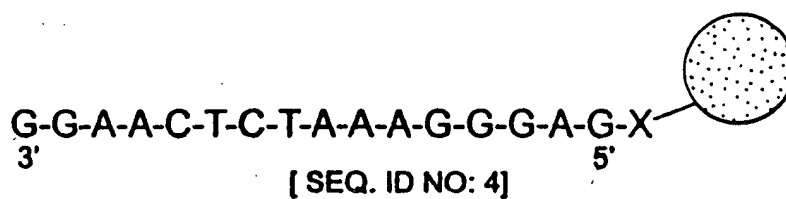
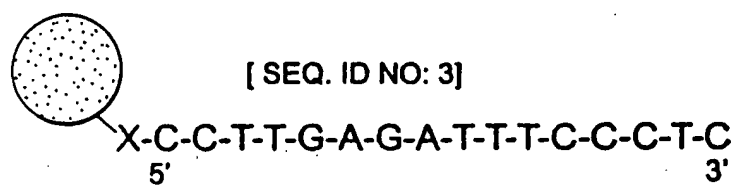


FIG. 2

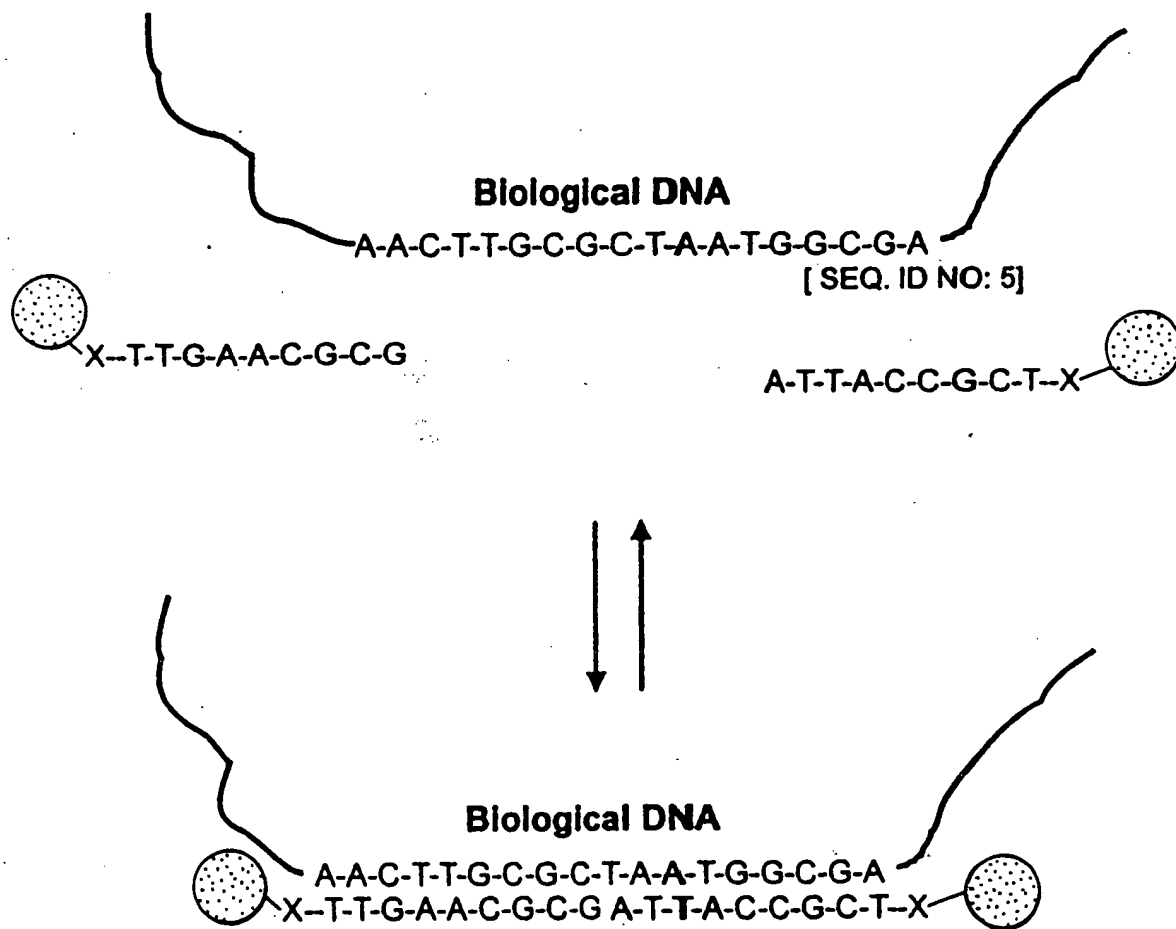
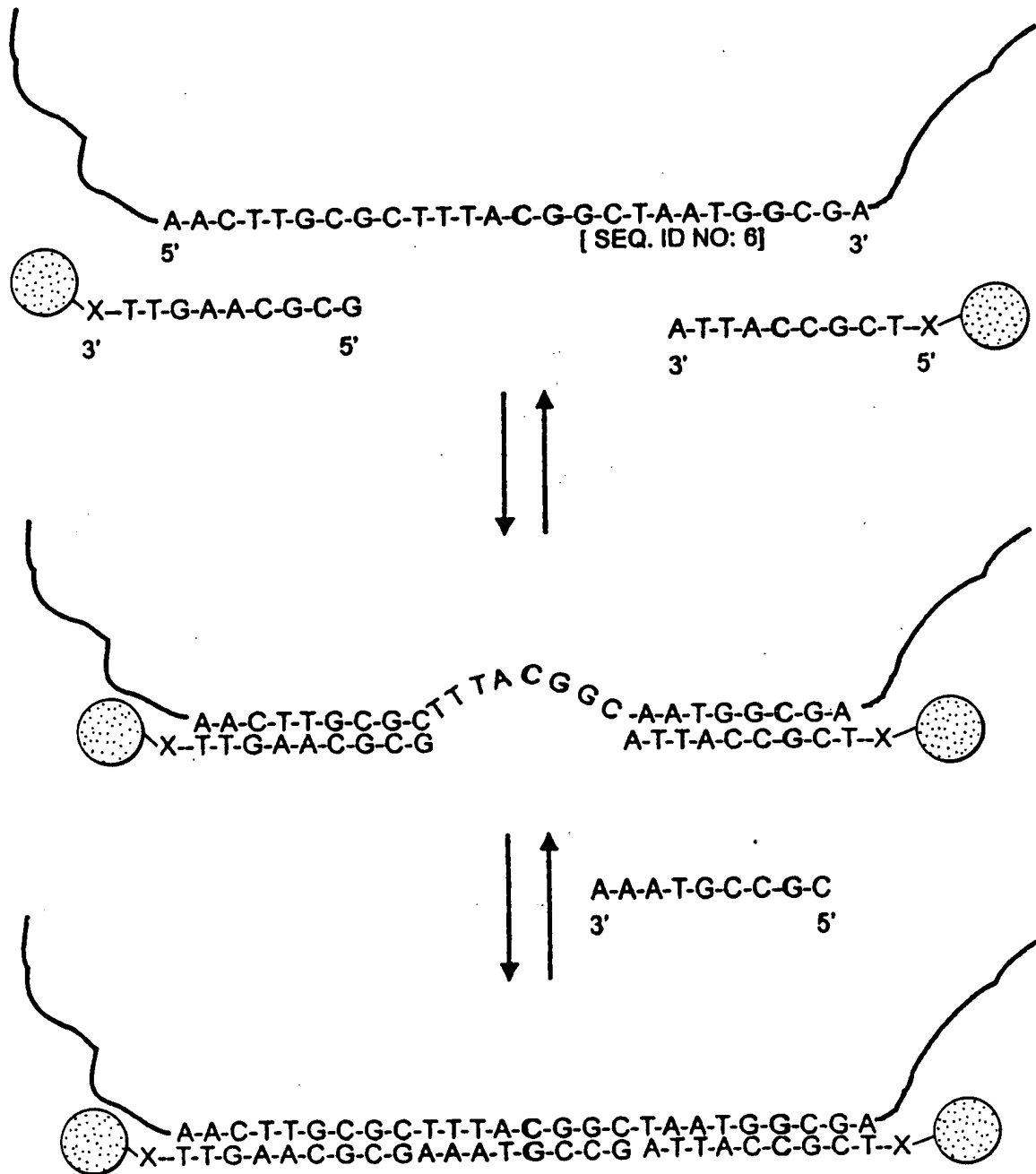


FIG. 3



Linking oligonucleotide

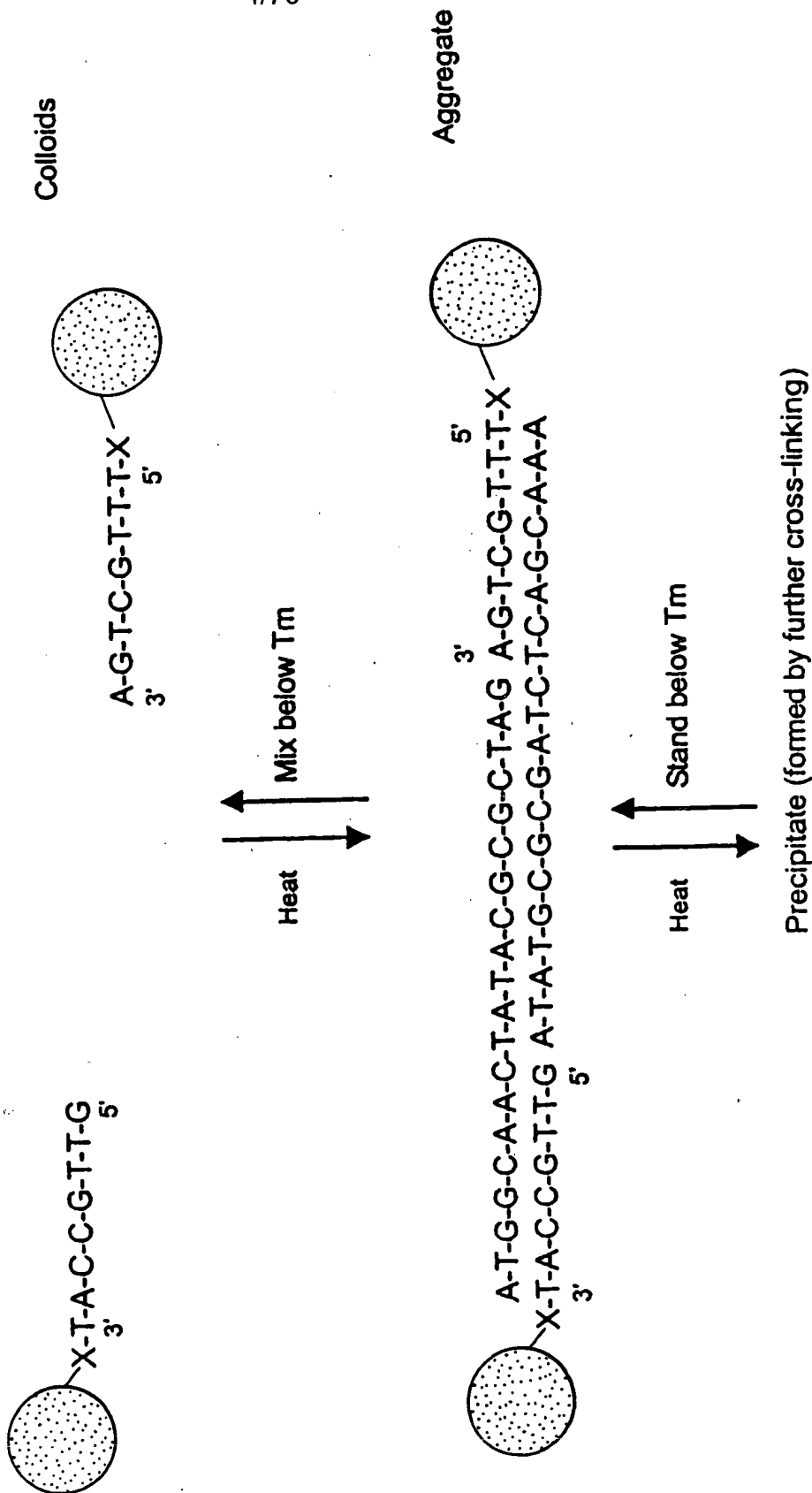
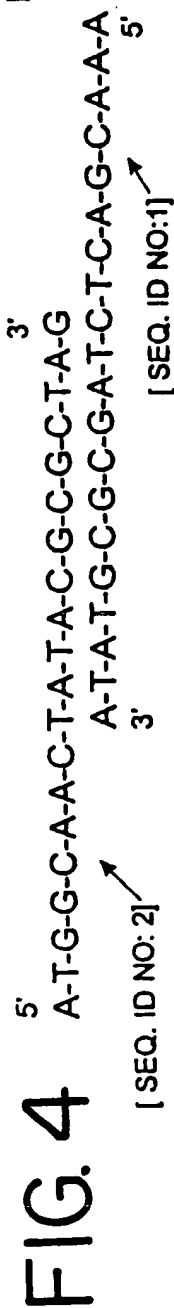
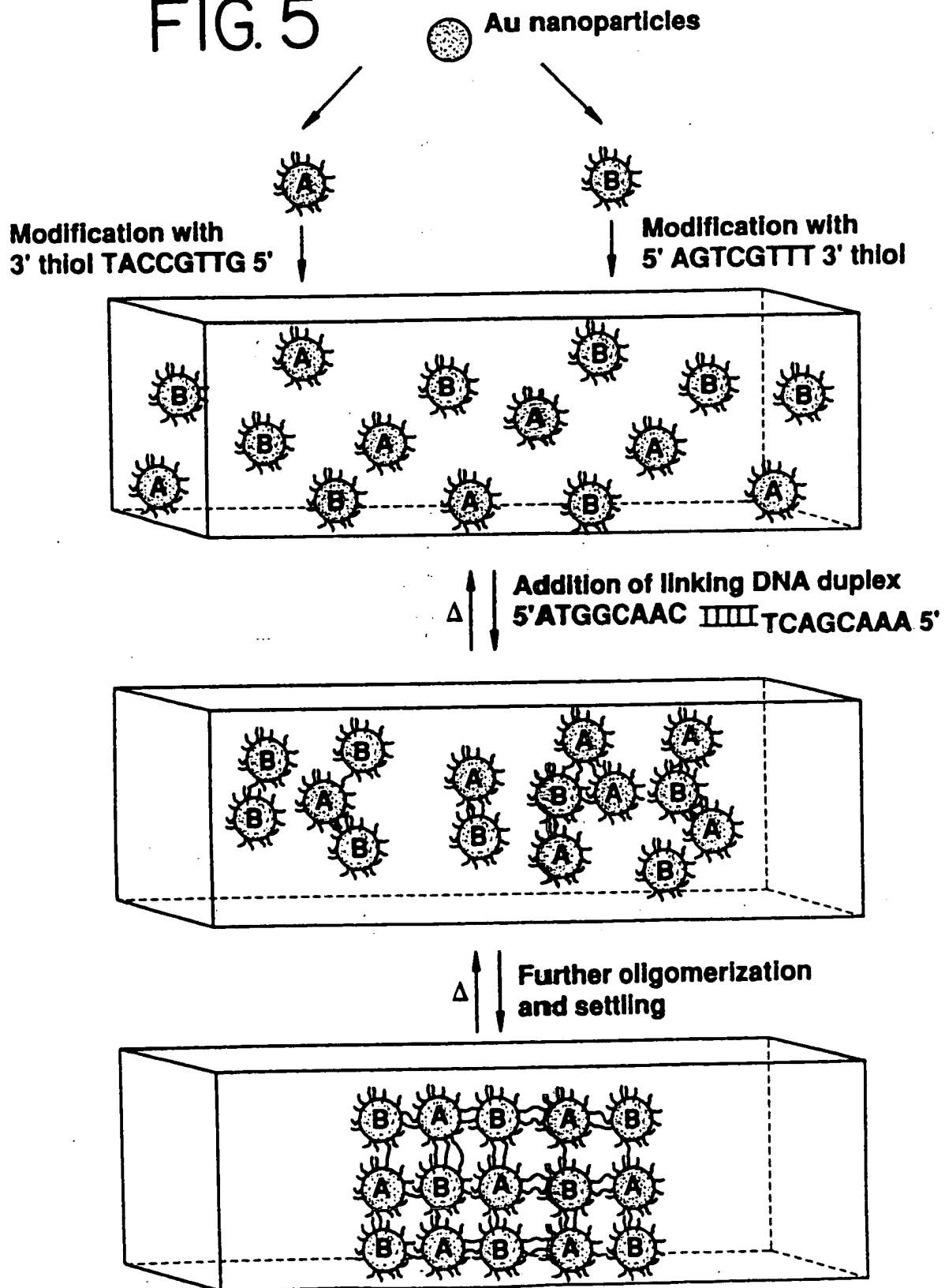


FIG. 5



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FIG. 6A FIG. 6B FIG. 6C



FIG. 7

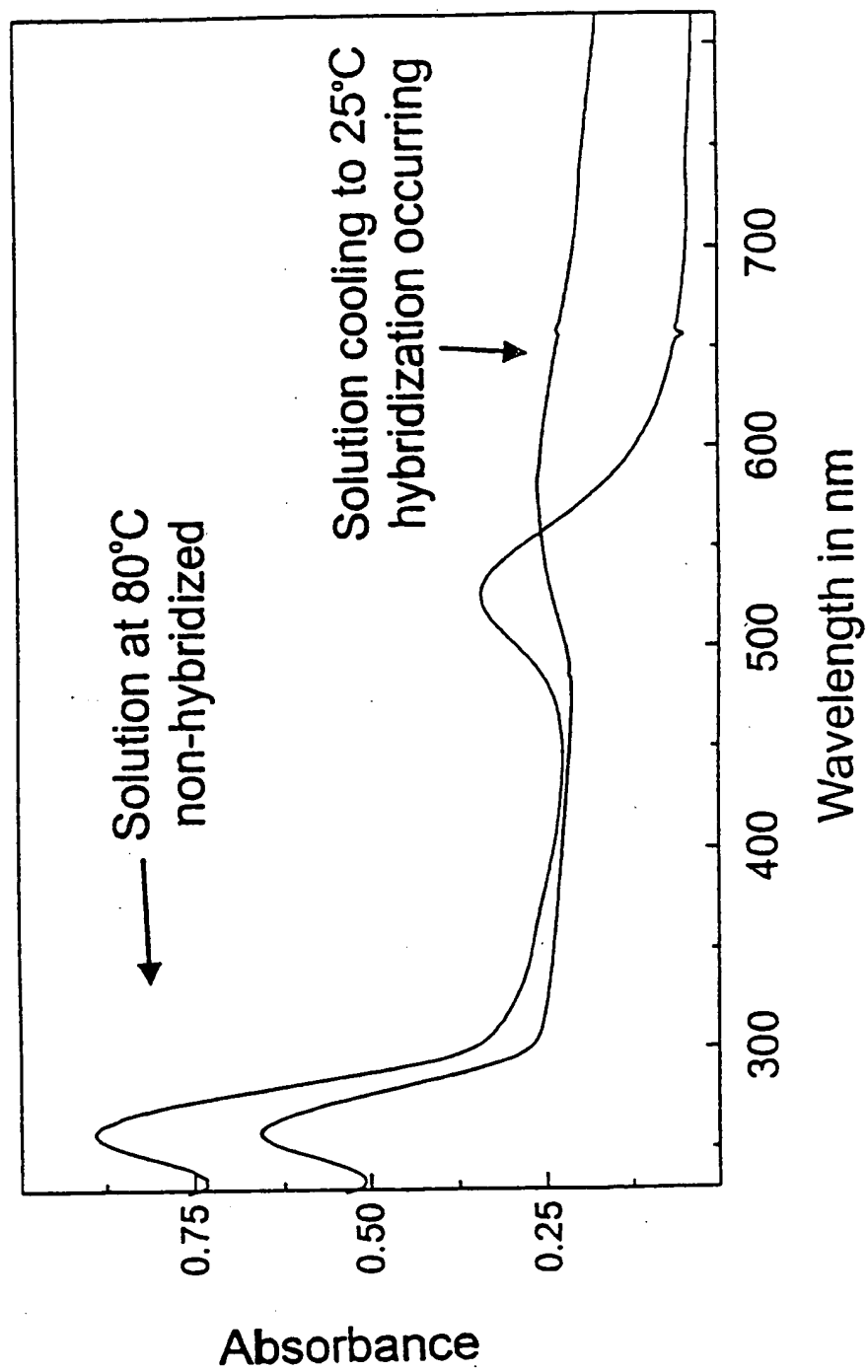


FIG. 8B

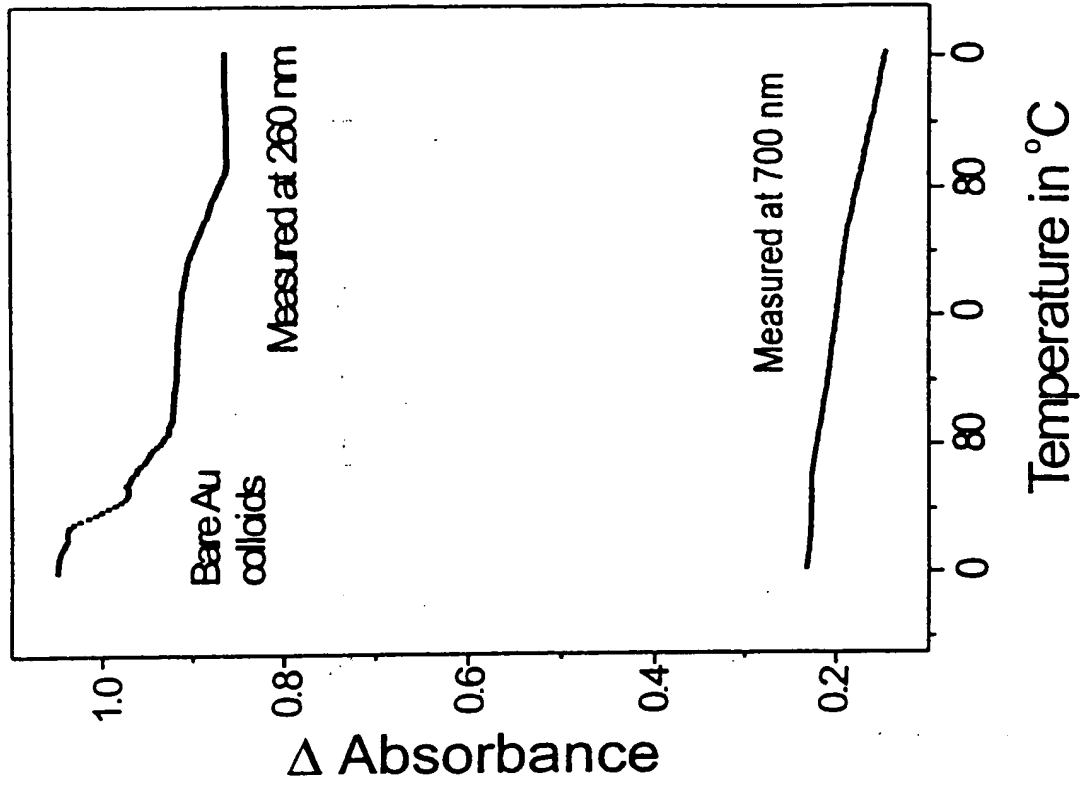
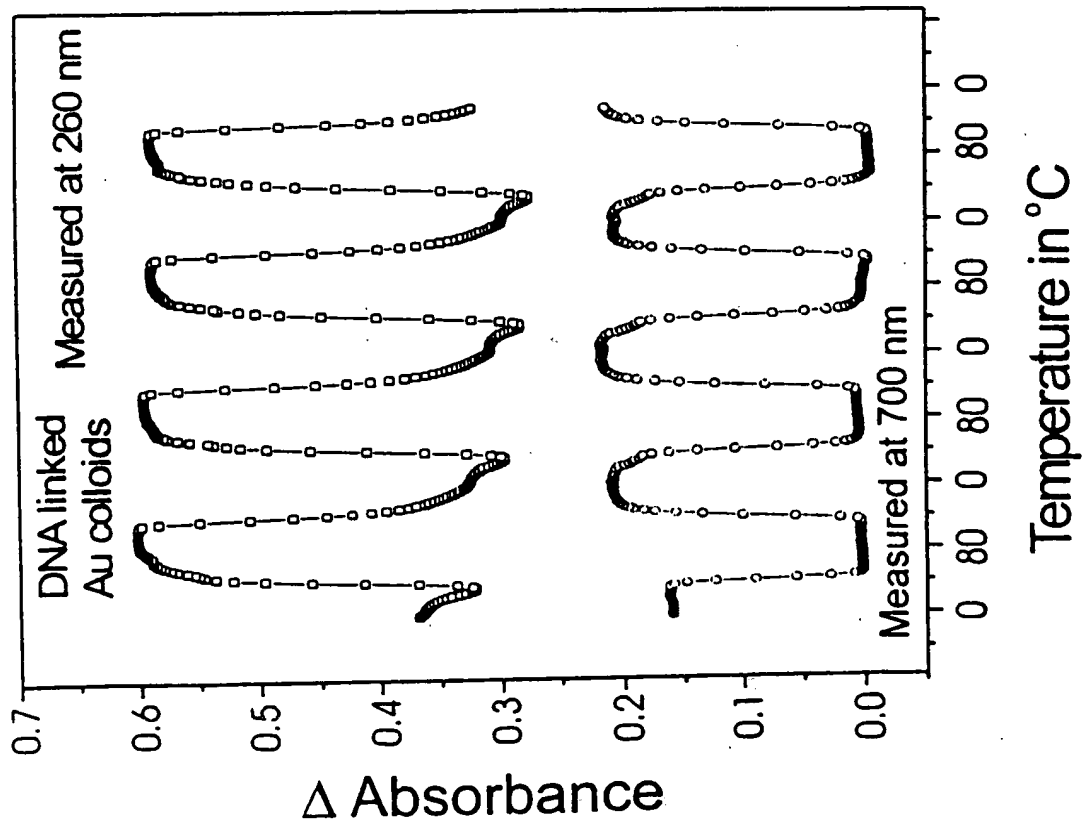


FIG. 8A





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FIG. 9A

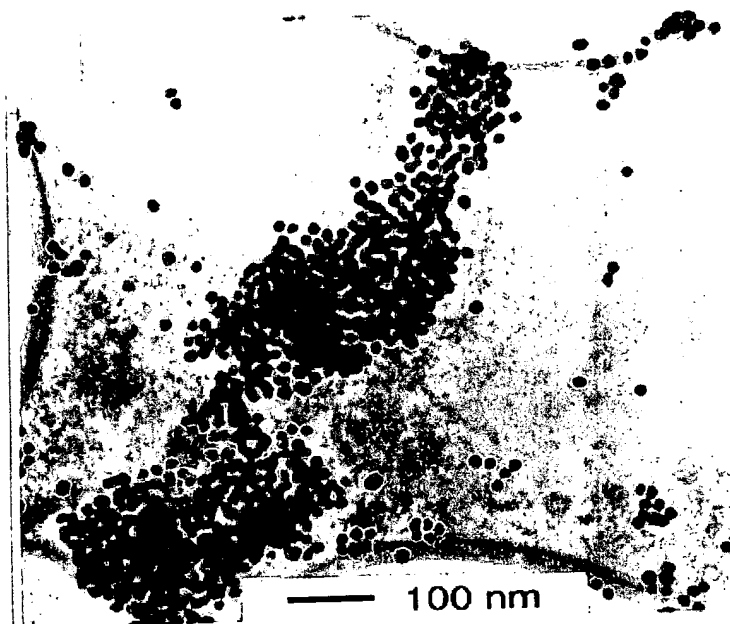
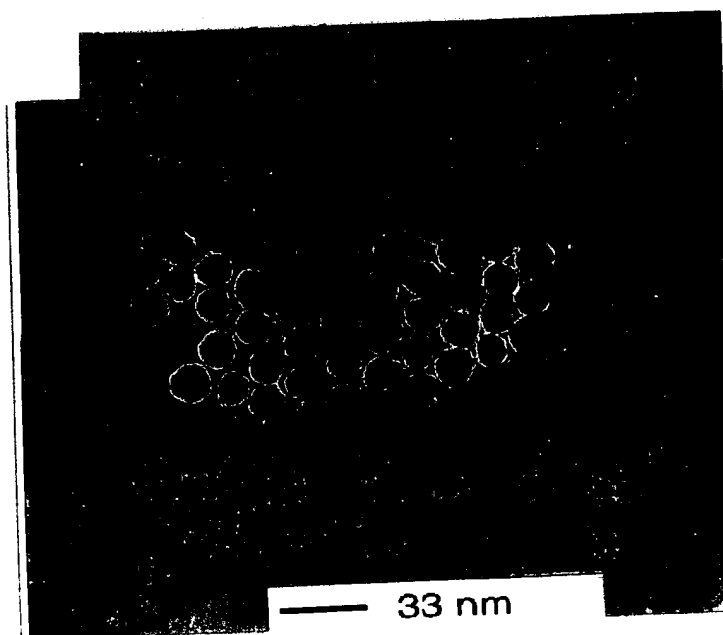


FIG. 9B



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FIG. 10

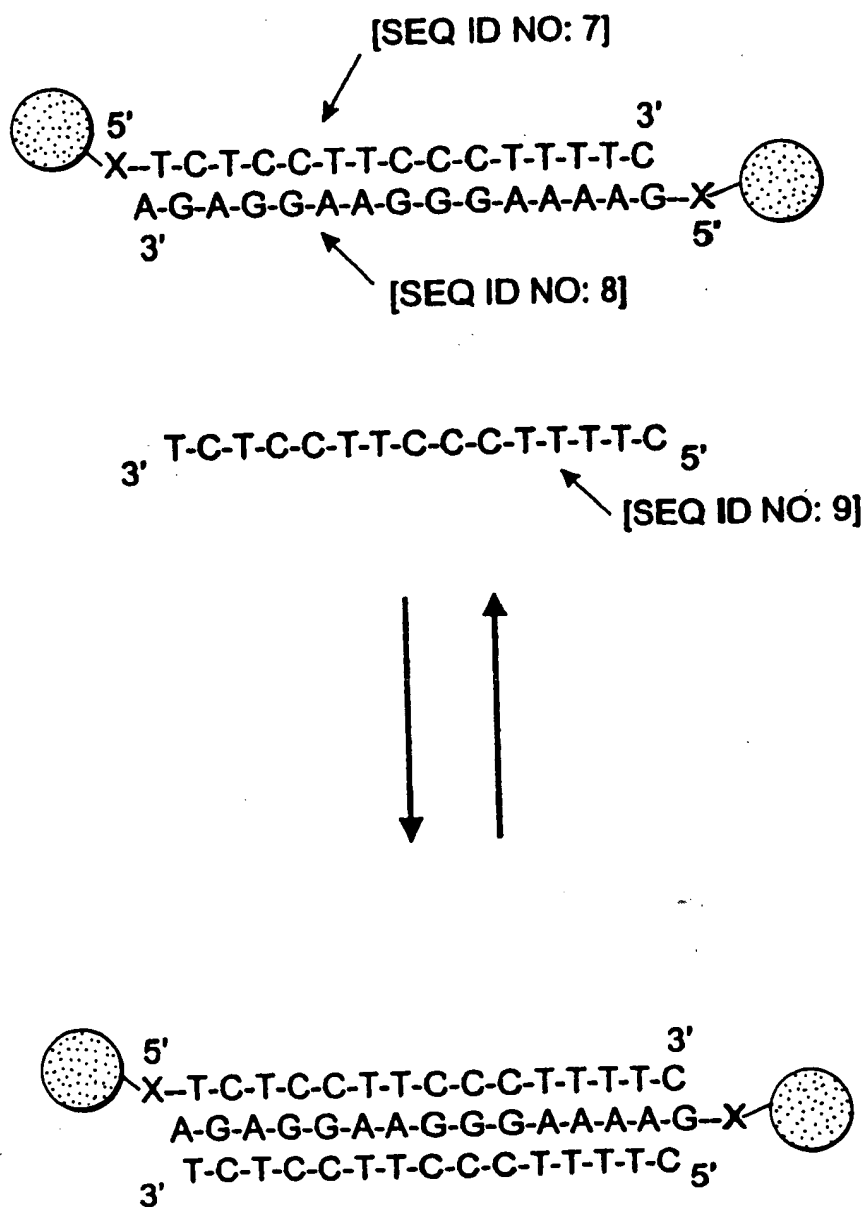
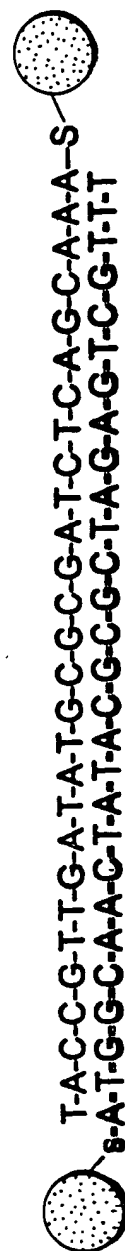
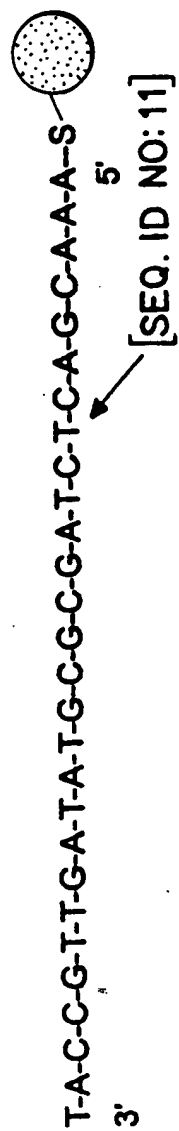
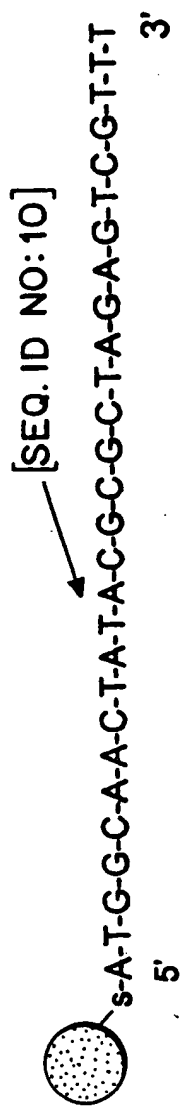
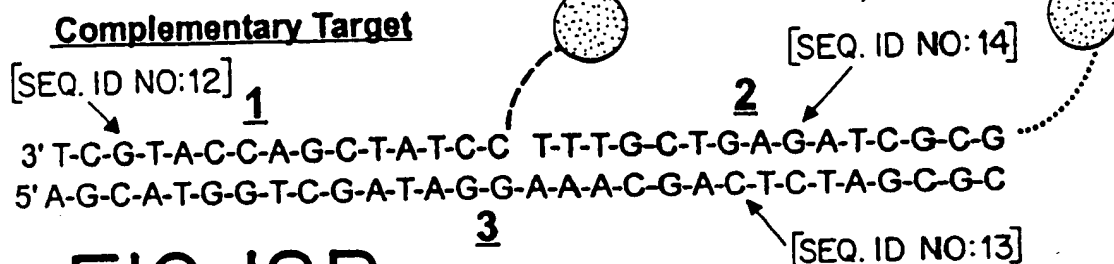


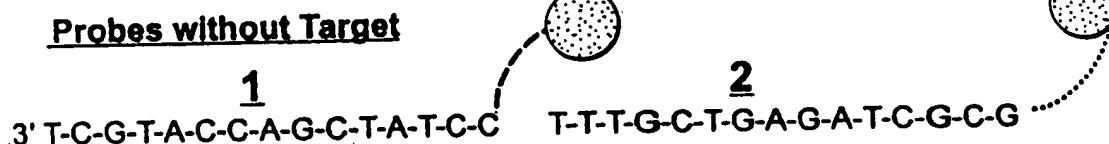
FIG. 11



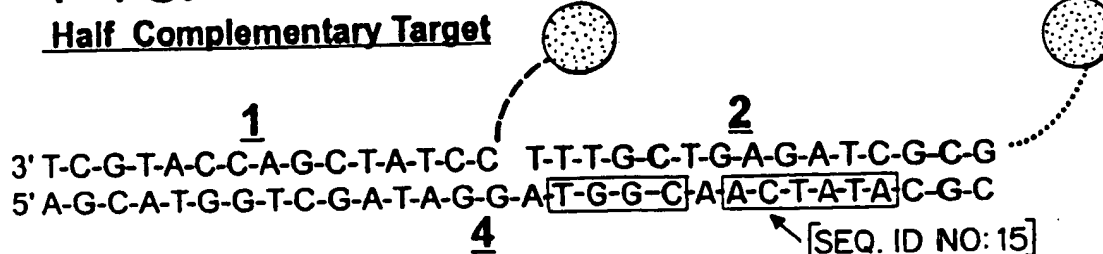
# FIG. 12A



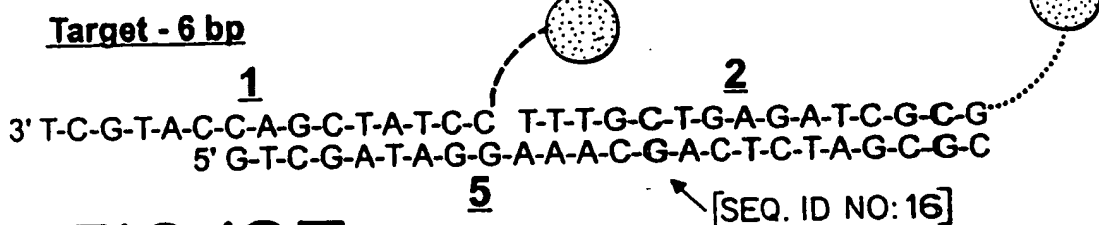
# FIG. 12B



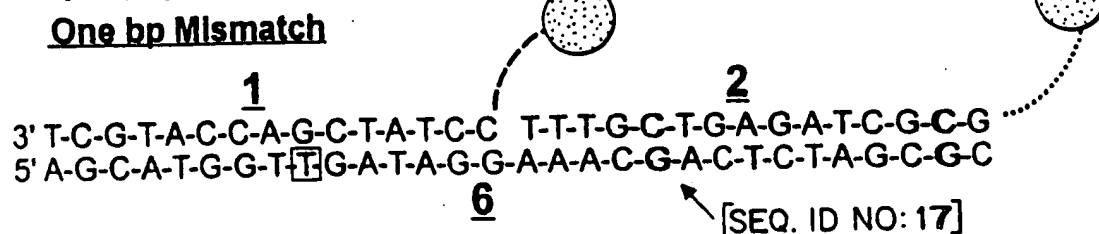
# FIG. 12C



# FIG. 12D



# FIG. 12E



# FIG. 12F

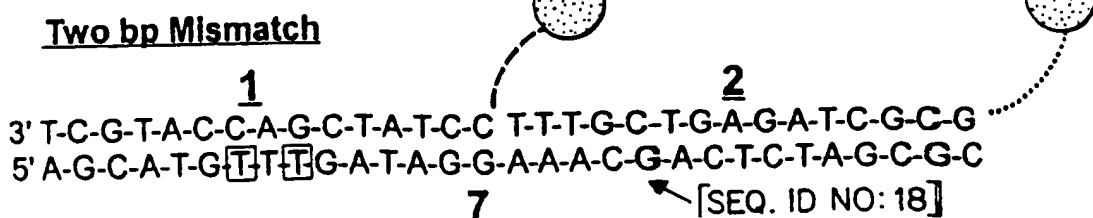
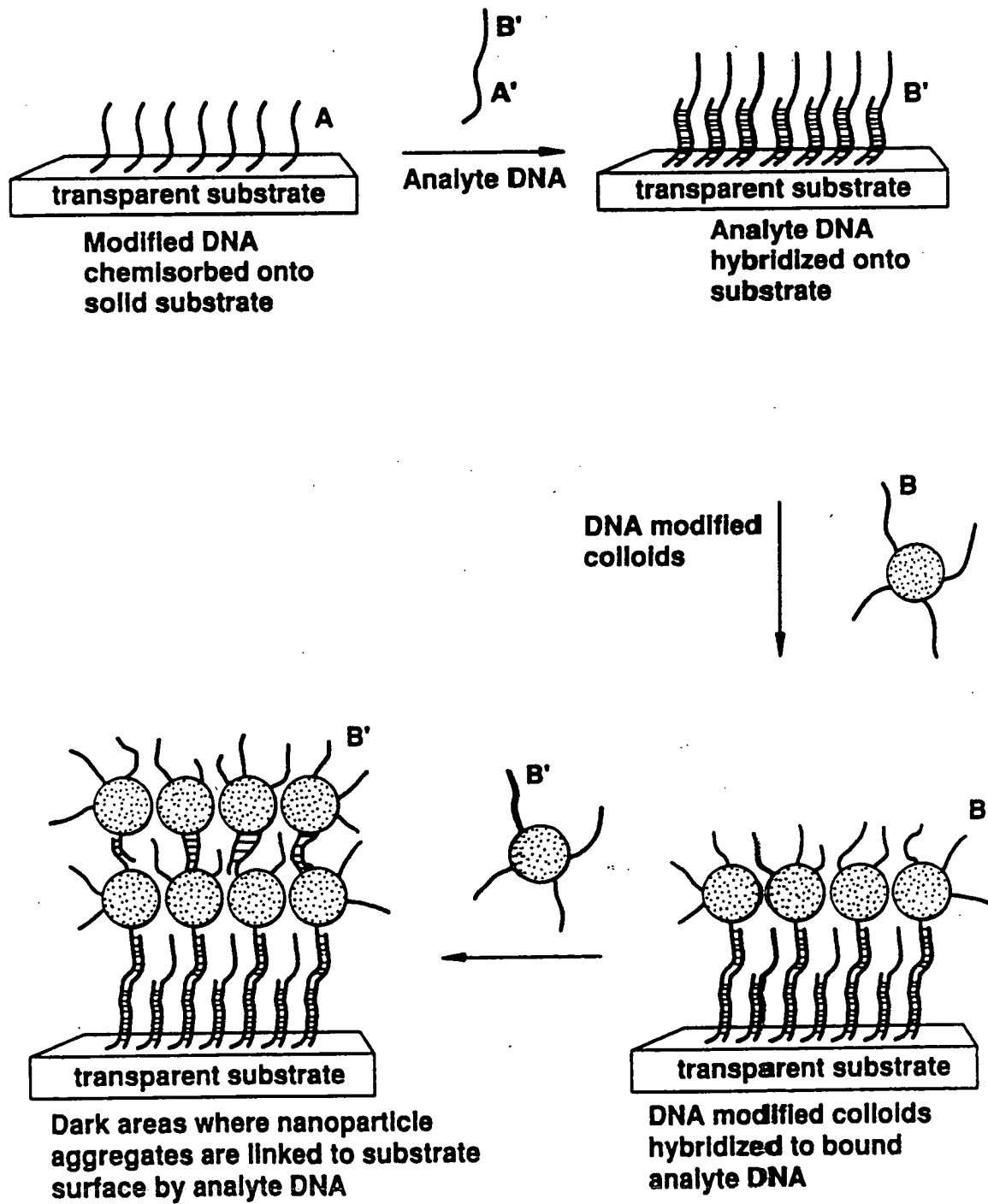


FIG. 13A



# FIG. 13B

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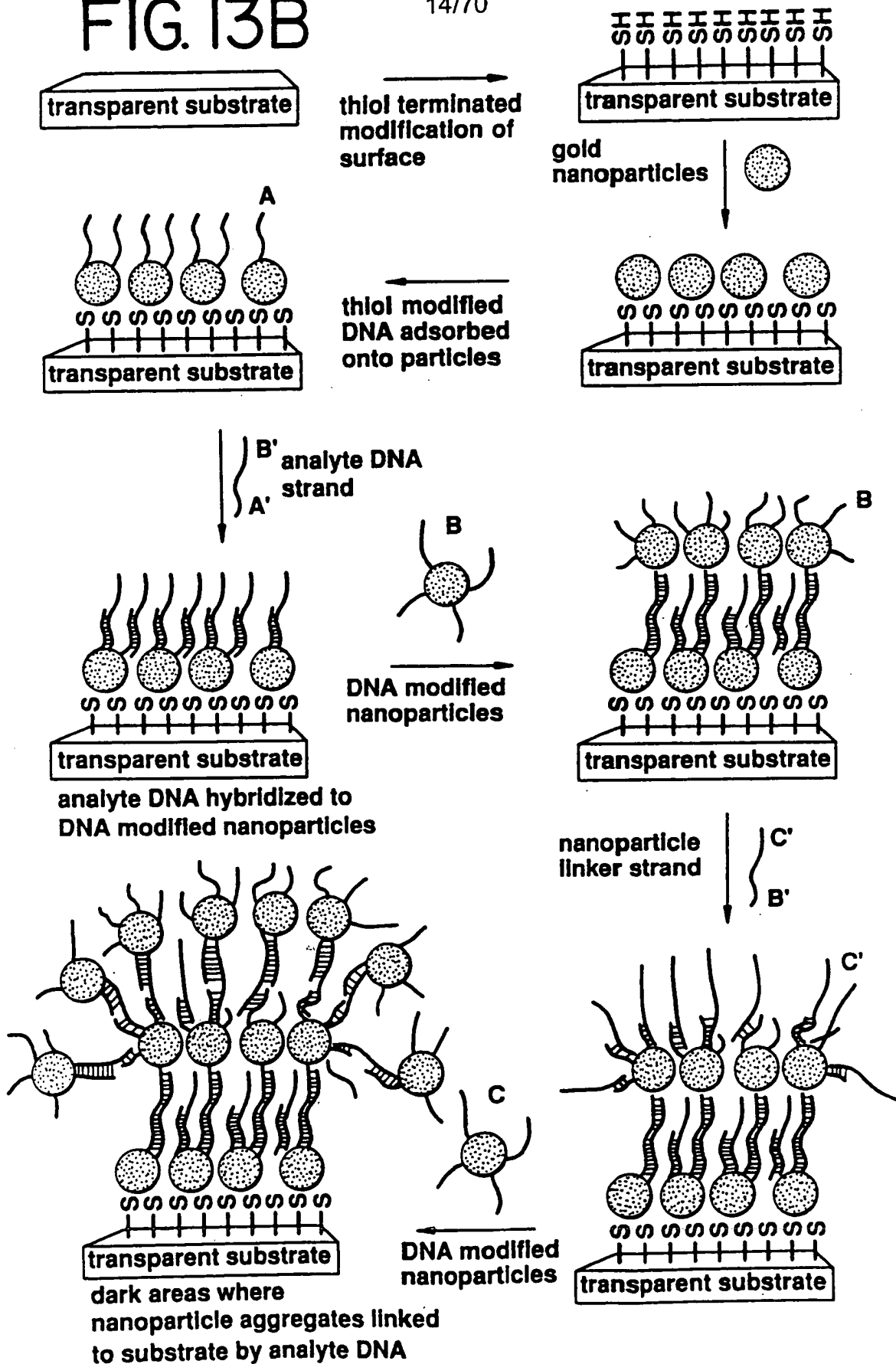


FIG. 14A

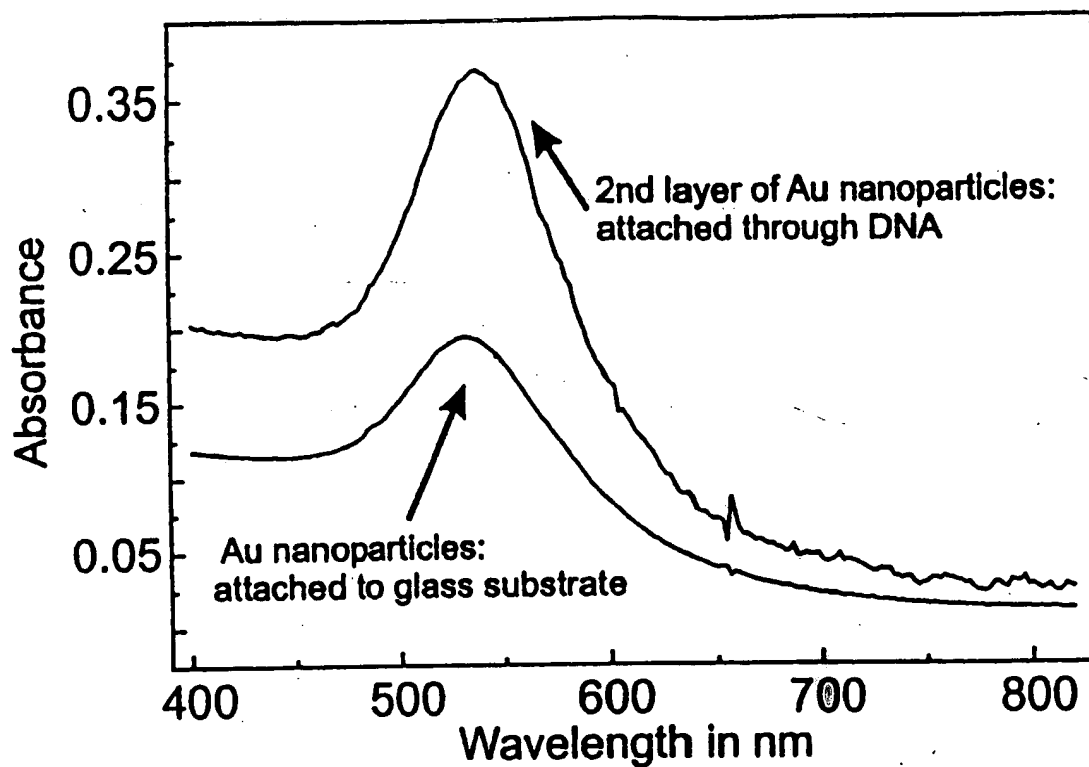


FIG. 14B

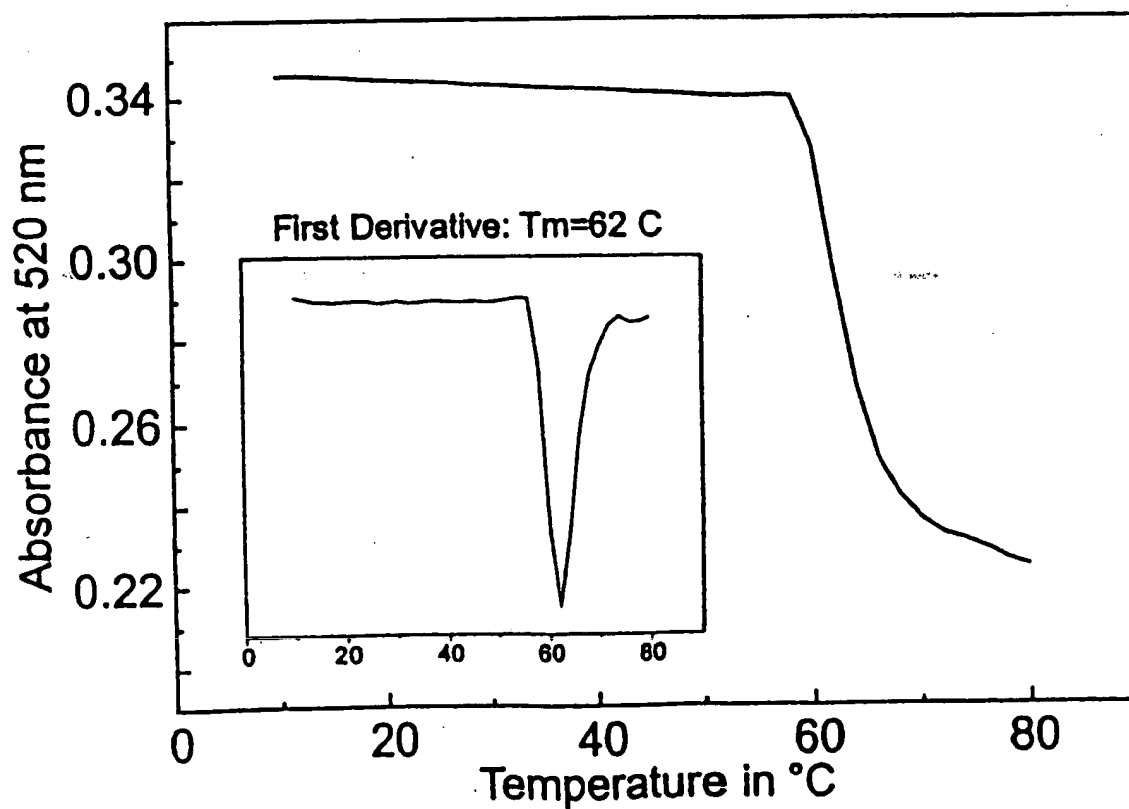


FIG. 15A

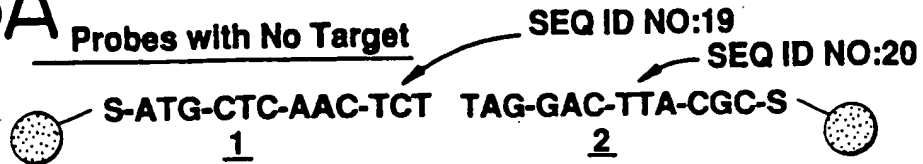


FIG. 15B

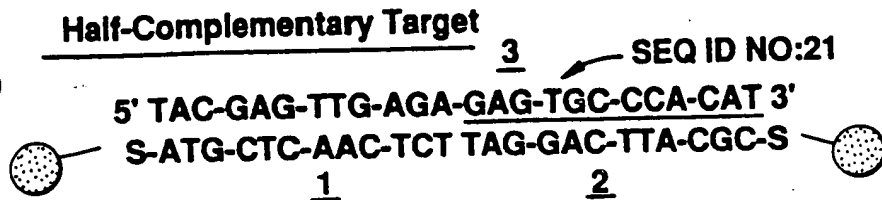


FIG. 15C

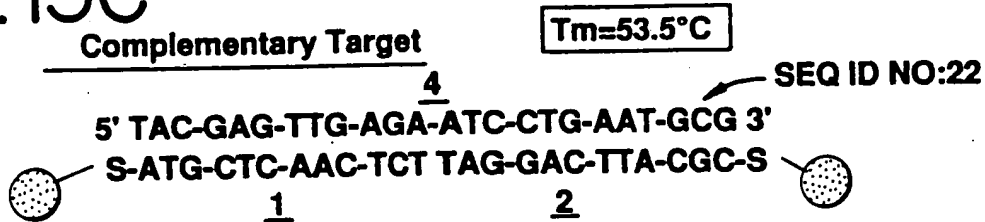


FIG. 15D

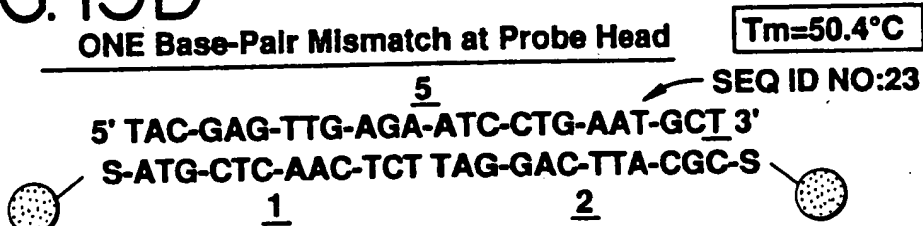


FIG. 15E

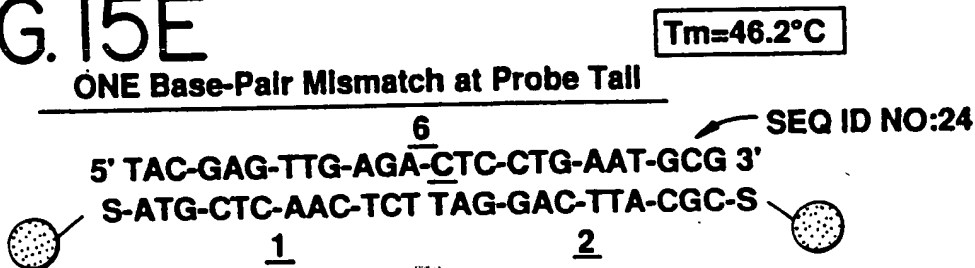


FIG. 15F

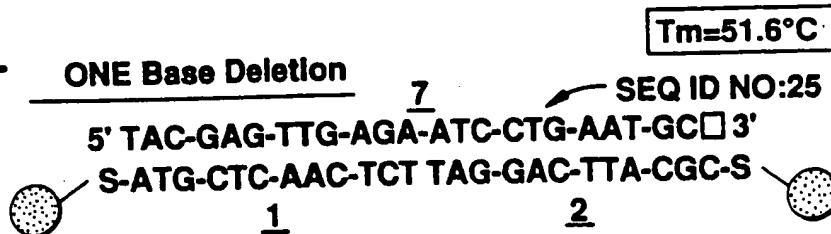
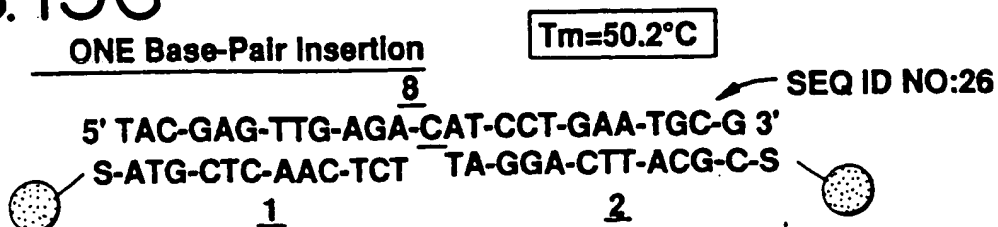


FIG. 15G





# FIG. 16A

## 24 Base Template

5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GCG 3'  
—S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S —  
1 2

# FIG. 16B

## 48 Base Template with Complementary 24 Base Filler

5' TAC-GAG-TTG-AGA-CCG-TTA-AGA-CGA-GGC-AAT-CAT-GCA-ATC-CTG-AAT-GCG 3'  
—S-ATG-CTC-AAC-TCT GGC-AAT-TCT-GCT-CCG-TTA-GTA-CGT TAG-GAC-TTA-CGC-S —  
1 2

# FIG. 16C

## 72 Base Template with Complementary 48 Base Filler

5' TAC-GAG-TTG-AGA-CCG-TTA-AGA-CGA-GGC-AAT-CAT-GCA-TAT-ATT-GGA-CCG-TTT-ACG-GAC-AAC-ATC-CTG-AAT-GCG 3'  
—S-ATG-CTC-AAC-TCT GGC-AAT-TCT-GCT-CCG-TTA-GTA-CGT-ATA-TAA-CCT-GCG-AAA-TGC-CTG-TTG TAG-GAC-TTA-CGC-S —  
1 2

FIG. 17A

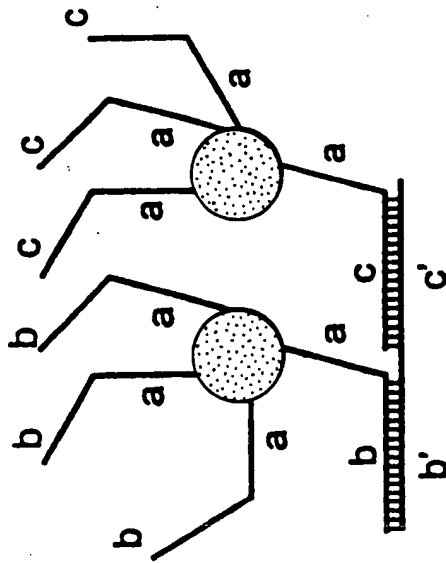


FIG. 17B

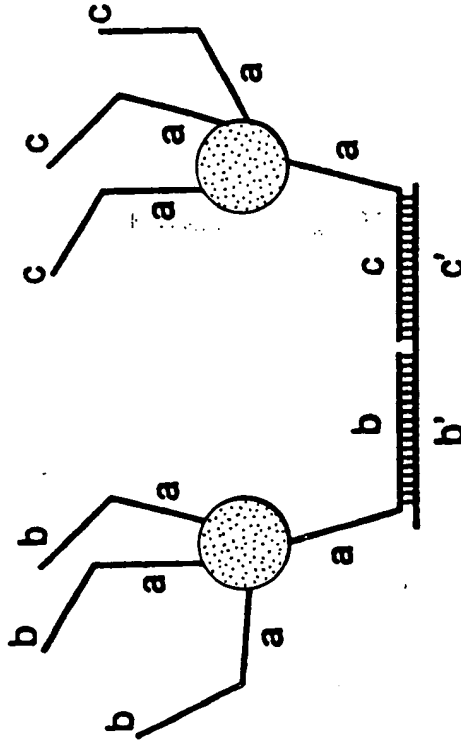


FIG. 17C

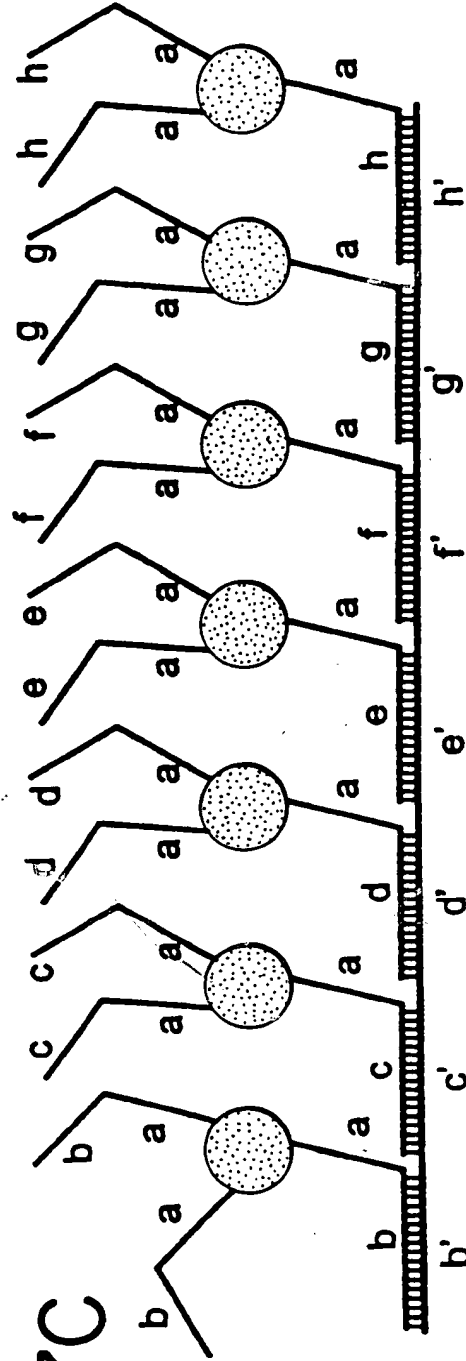


FIG. 17D



FIG. 17E

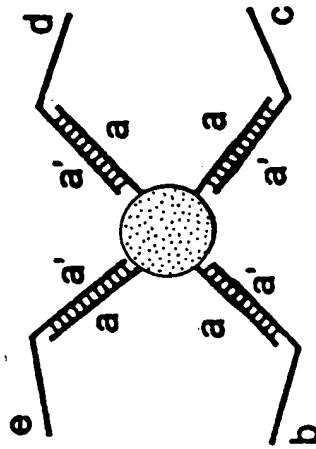


FIG. 18

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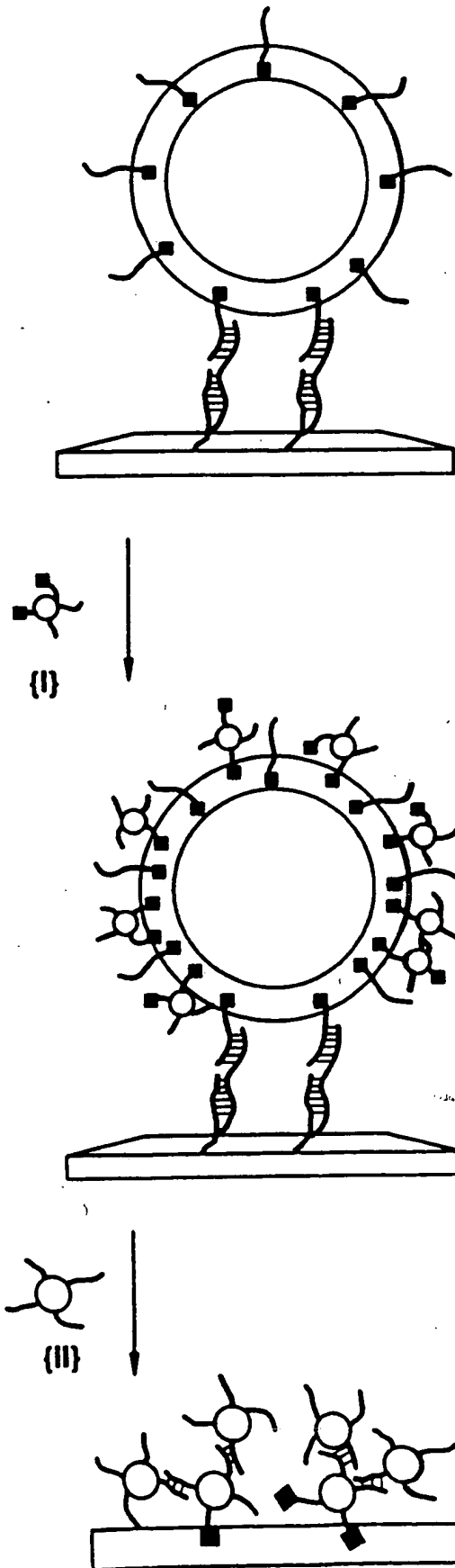


FIG. 19A

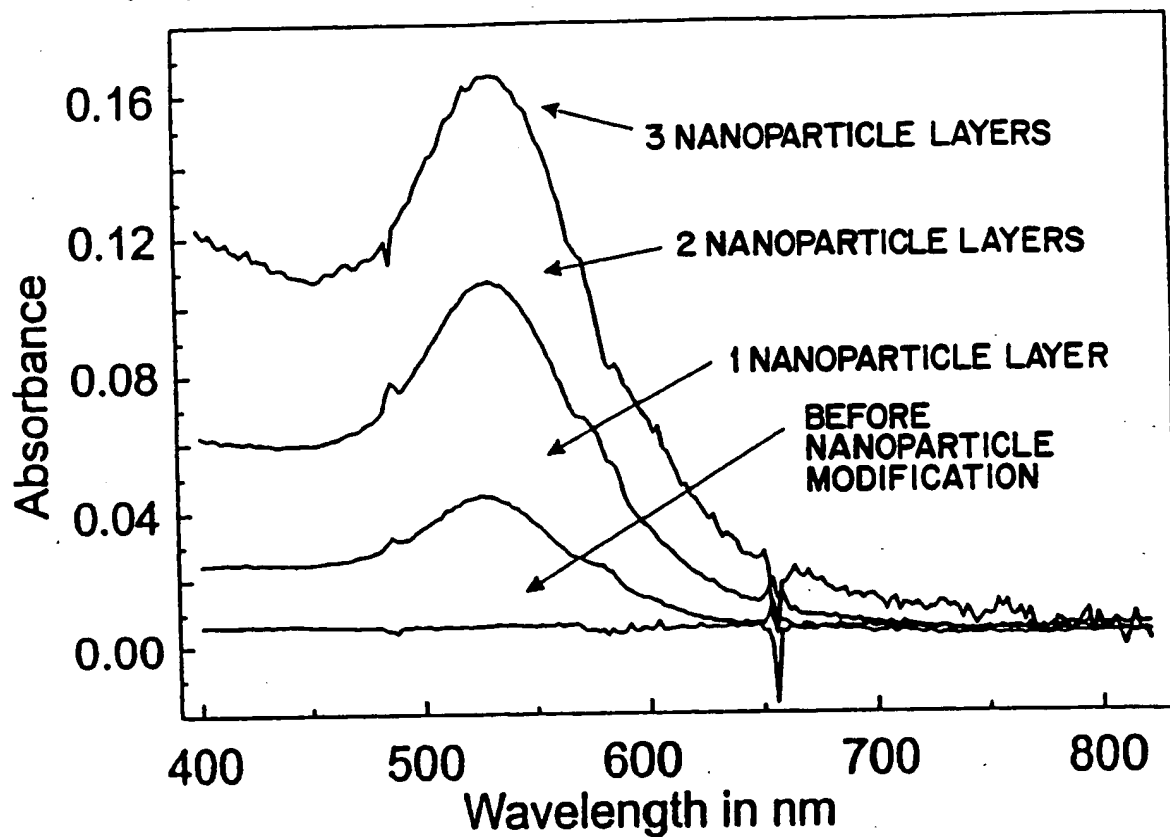


FIG. 19B

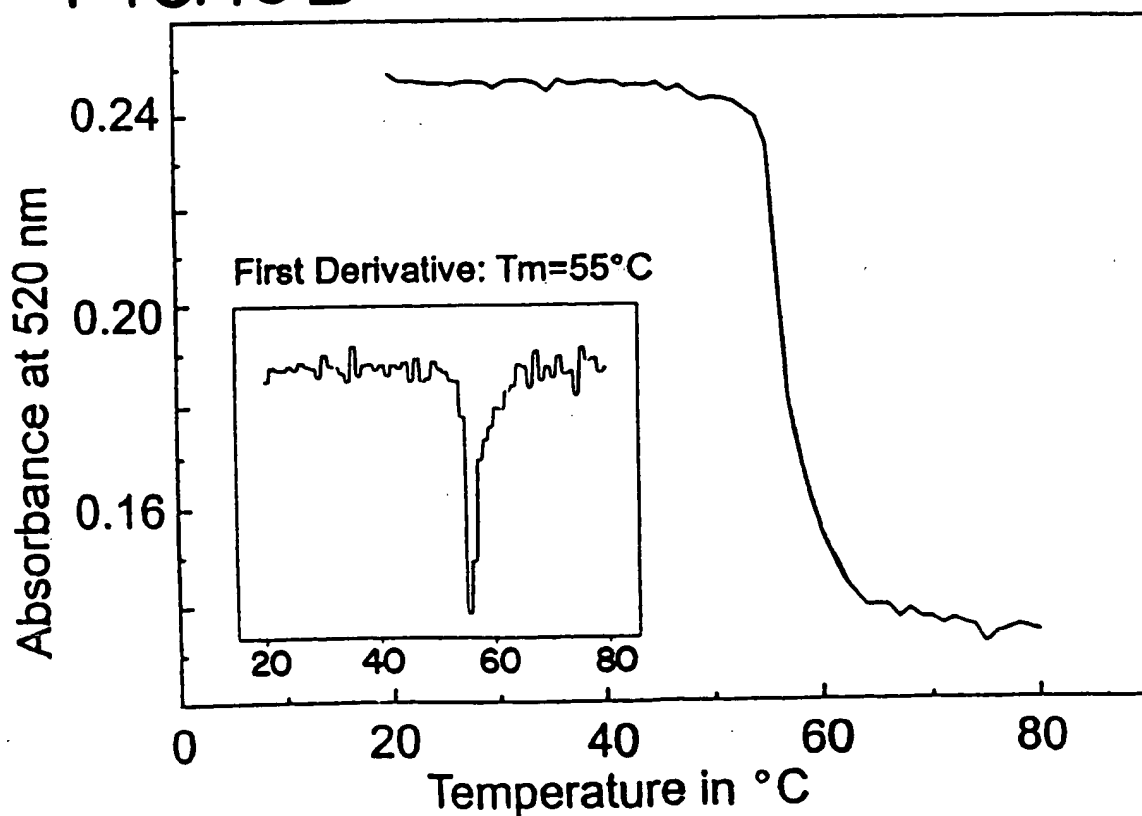


FIG. 20A

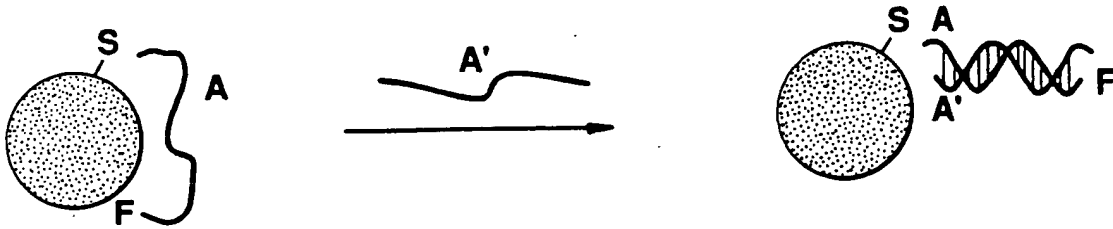
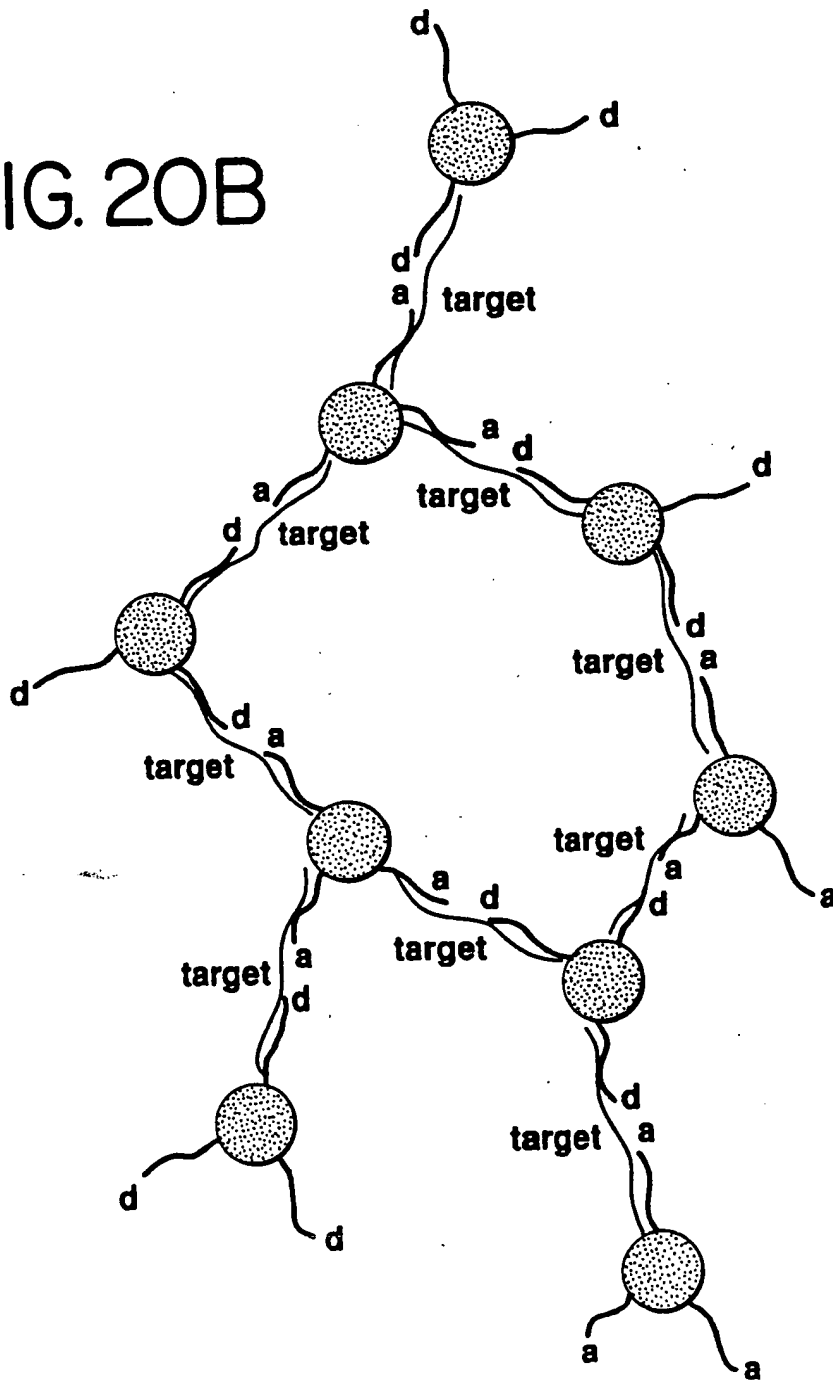


FIG. 20B



# FIG. 2I

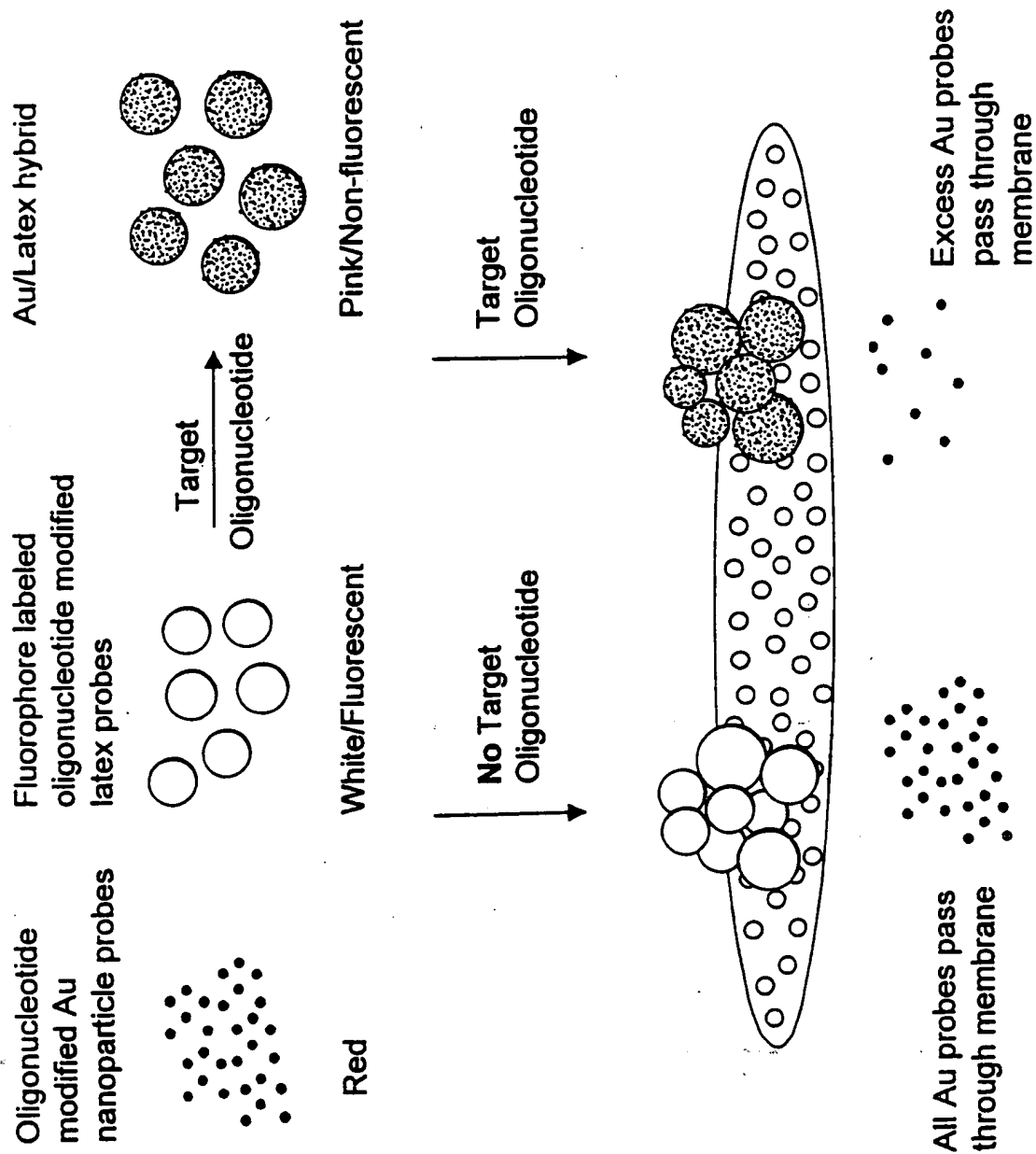
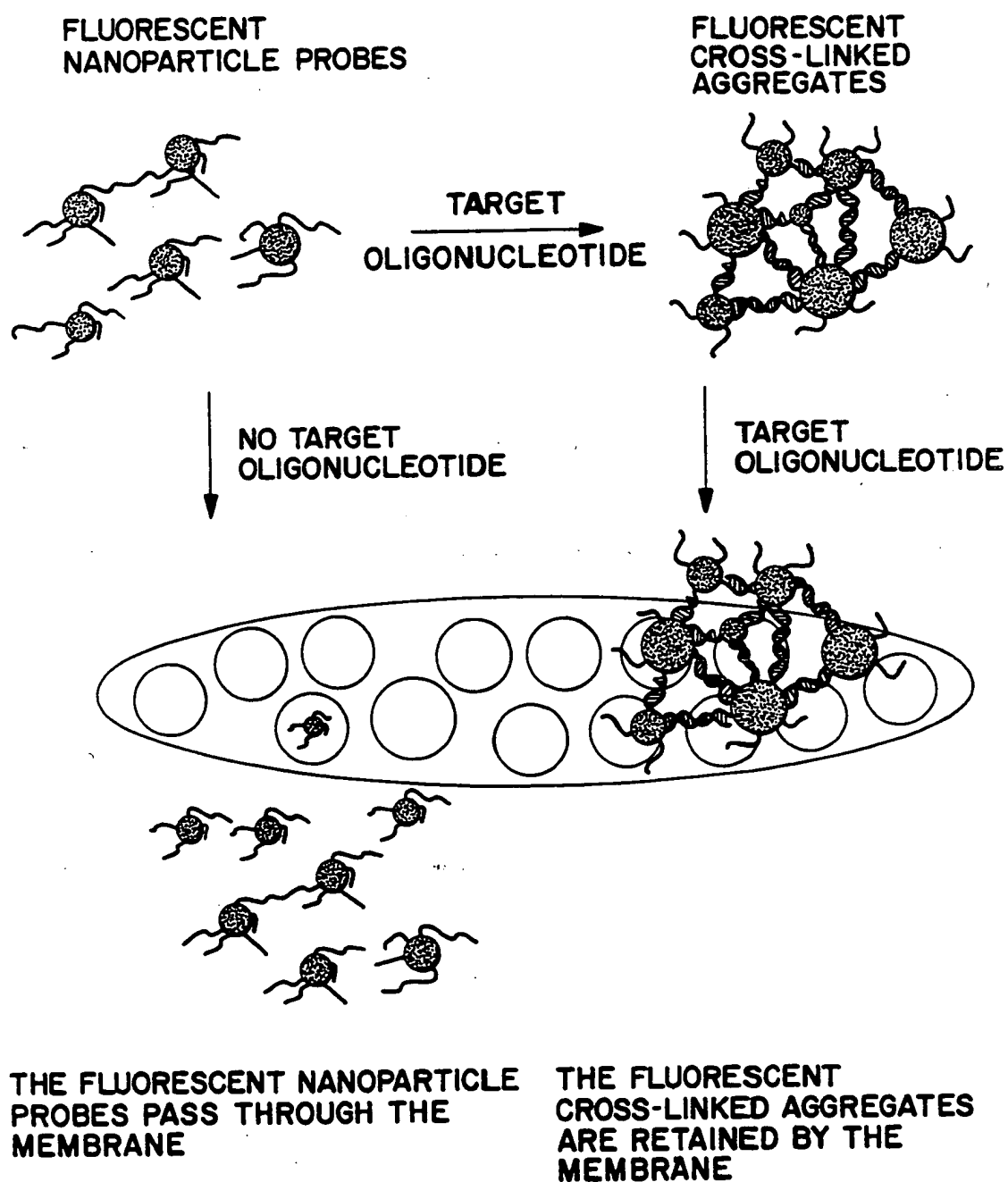


FIG. 22





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## FIG. 23


### Anthrax PCR Product


5'G GCG GAT GAG TCA GTA GTT AAG GAG GCT CAT AGA GAA GTA ATT AAT  
3'C CGC CTA CTC AGT CAT CAA TTC CTC CGA GTA TCT CTT CAT TAA TTA

TCG TCA ACA GAG GGA TTA TTG TTA AAT ATT GAT AAG GAT ATA AGA AAA  
AGC AGT TGT CTC CCT AAT AAC AAT TTA TAA CTA TTC CTA TAT TCT TTT

ATA TTA TCC AGG GTT ATA TTG TAG AAA TTG AAG ATA CTG AAG GGC TT 3'  
TAT AAT AGG TCC CAA TAT AAC ATC TTT AAC TTC TAT GAC TTC CCG AA 5'

**141 mer Anthrax PCR product** [SEQ ID NO:36]

3' CTC CCT AAT AAC AAT   
[SEQ ID NO:37]

3' TTA TAA CTA TTC CTA   
[SEQ ID NO:38]

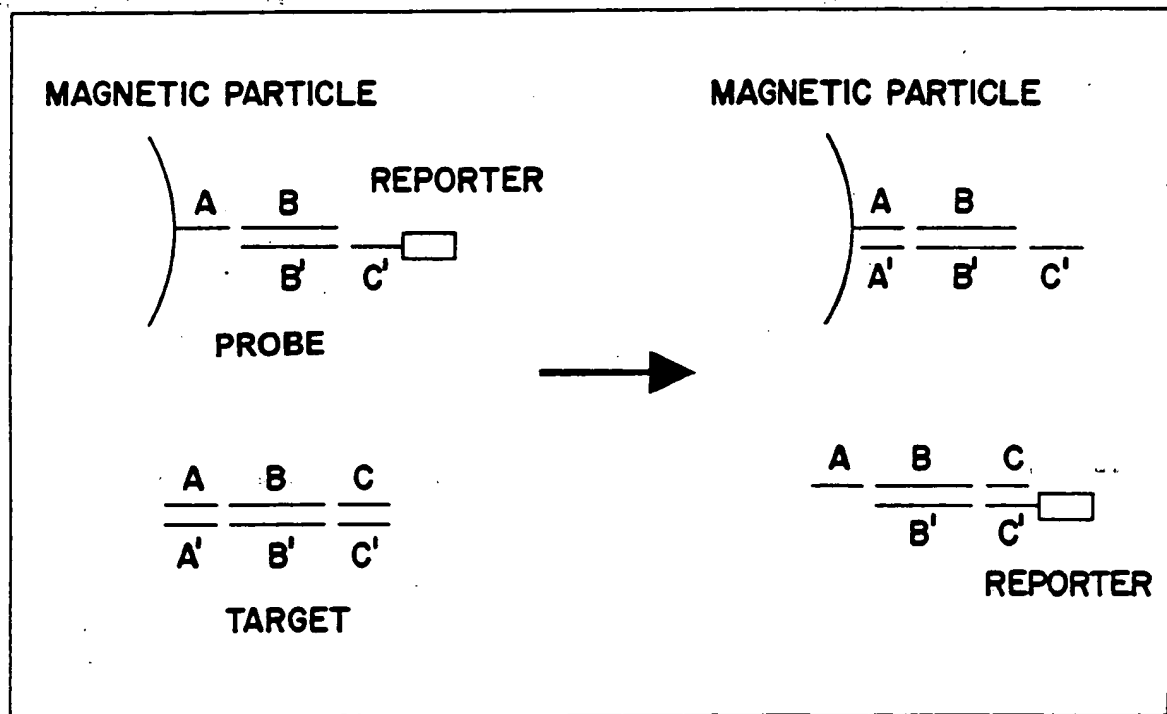
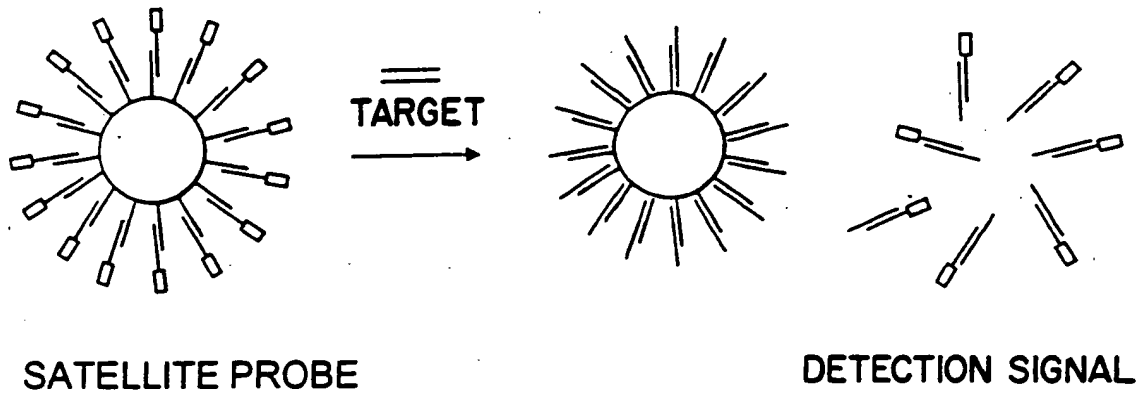
Oligonucleotide-Nanoparticle Probes

### Blocker Oligonucleotides

3' C CGC CTA CTC AGT CAT CAA TTC CTC CGA GT  
3' A TCT CTT CAT TAA TTA AGC AGT TGT  
3' TAT TCT TTT TAT AAT AGG TCC CAA TAT  
3' AAC ATC TTT AAC TTC TAT GAC TTC CCG AA

[SEQ ID NO:39]  
[SEQ ID NO:40]  
[SEQ ID NO:41]  
[SEQ ID NO:42]

FIG. 24



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FIG. 25A

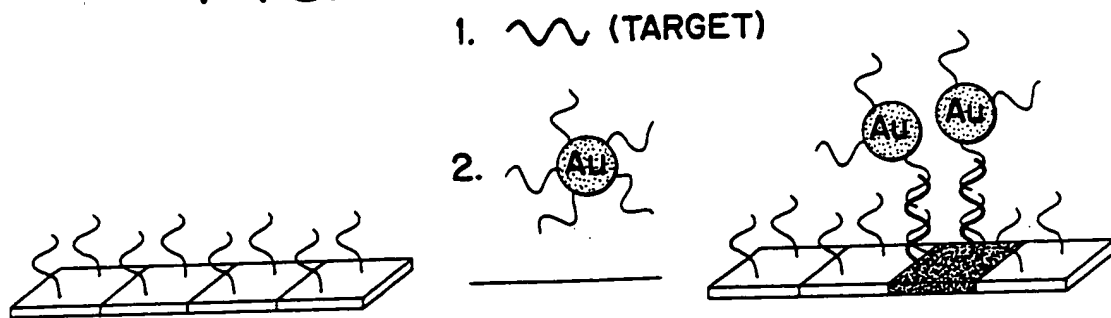


FIG. 25B

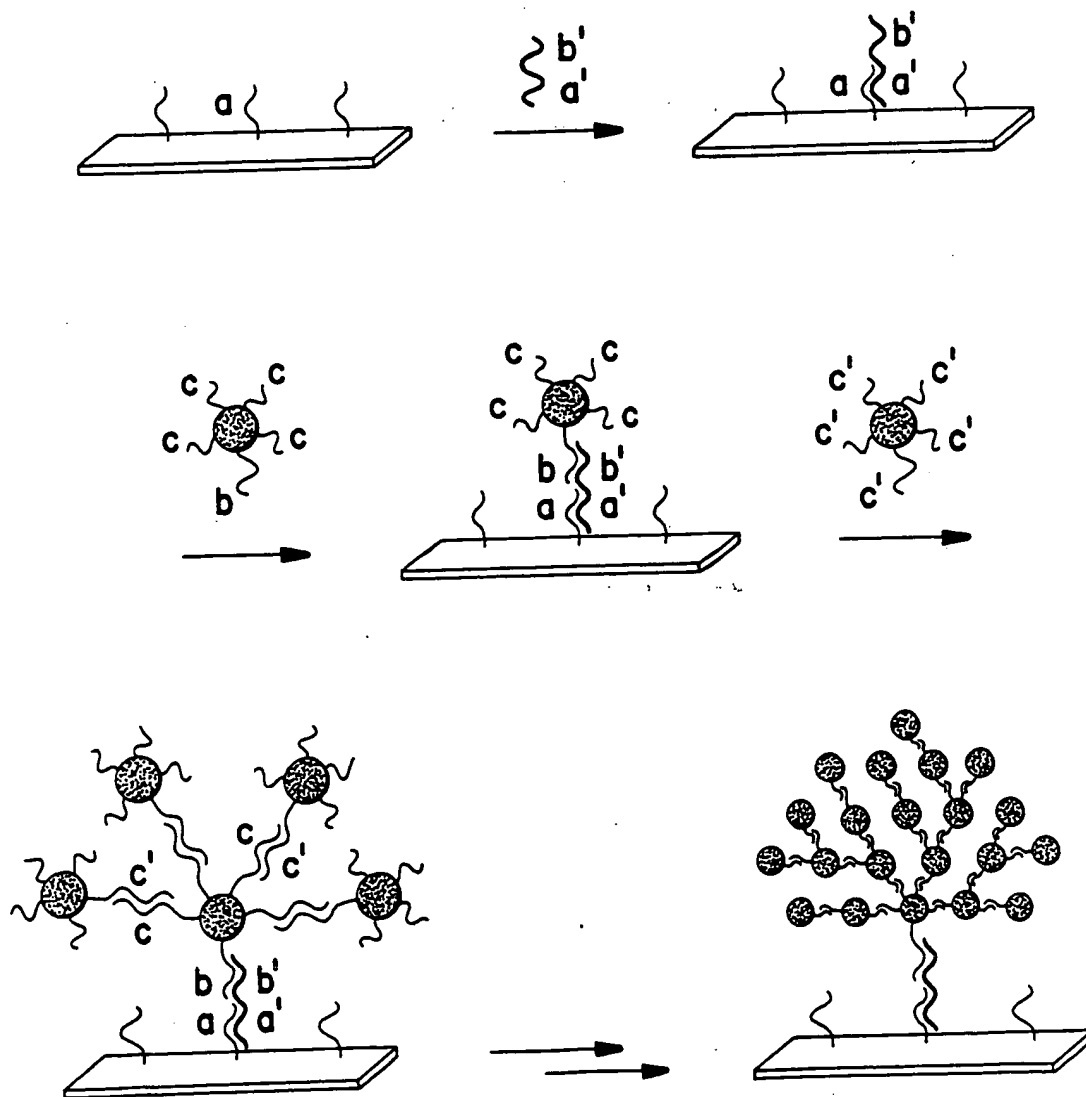


FIG. 26A

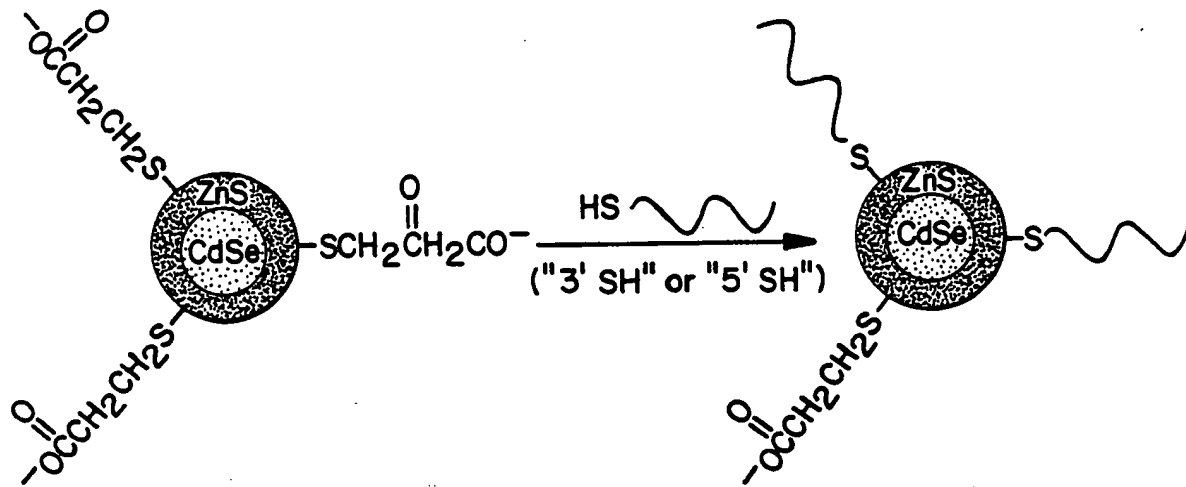


FIG. 26B

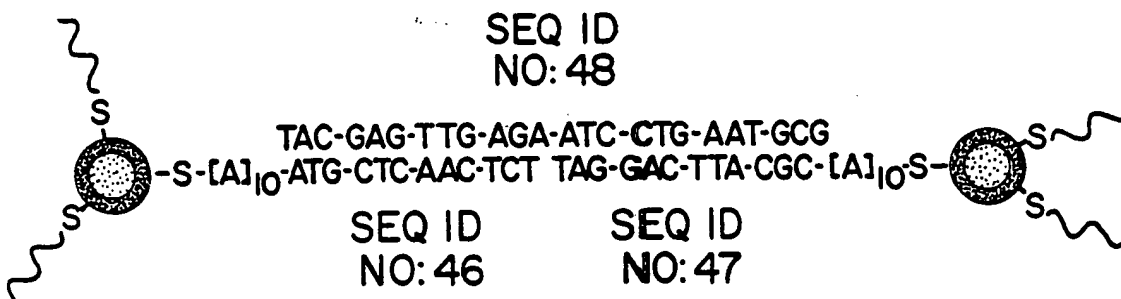


FIG. 27A

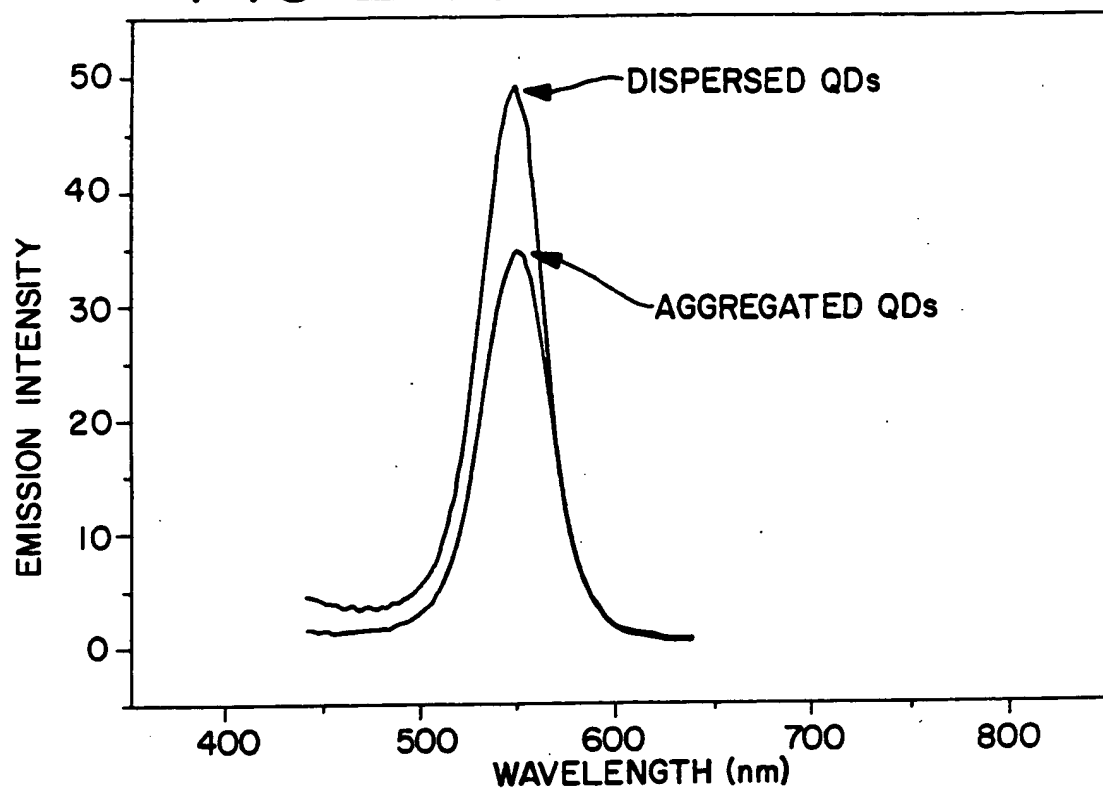
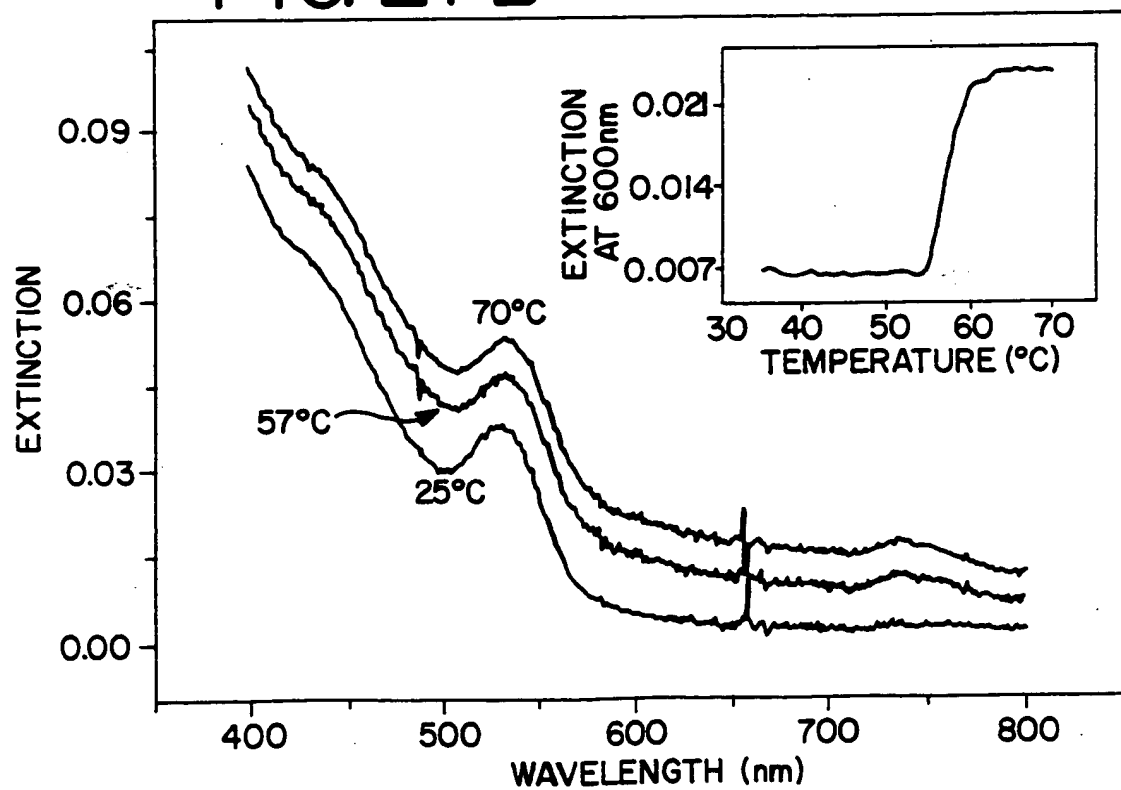


FIG. 27B



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FIG. 27C

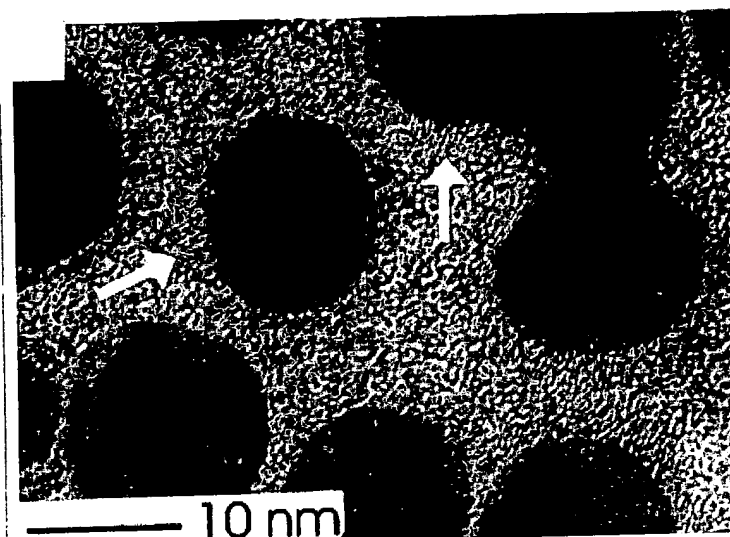


FIG. 27D

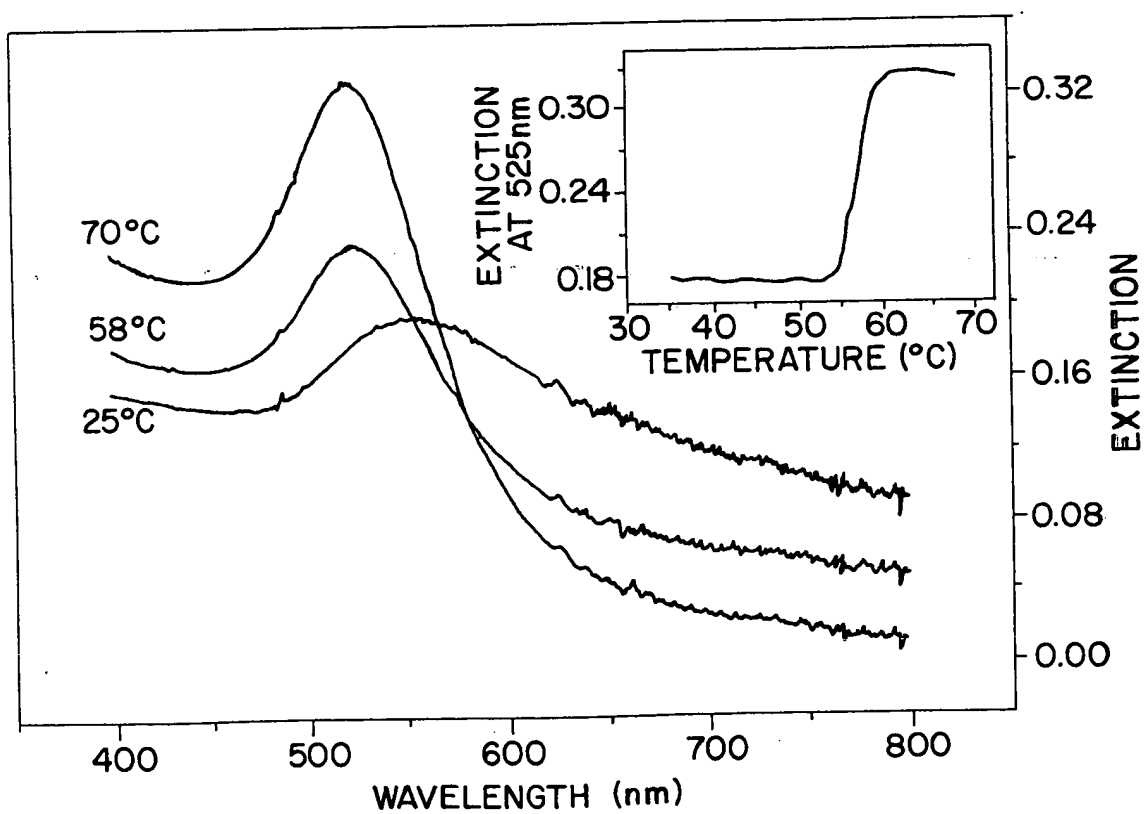


FIG. 28A

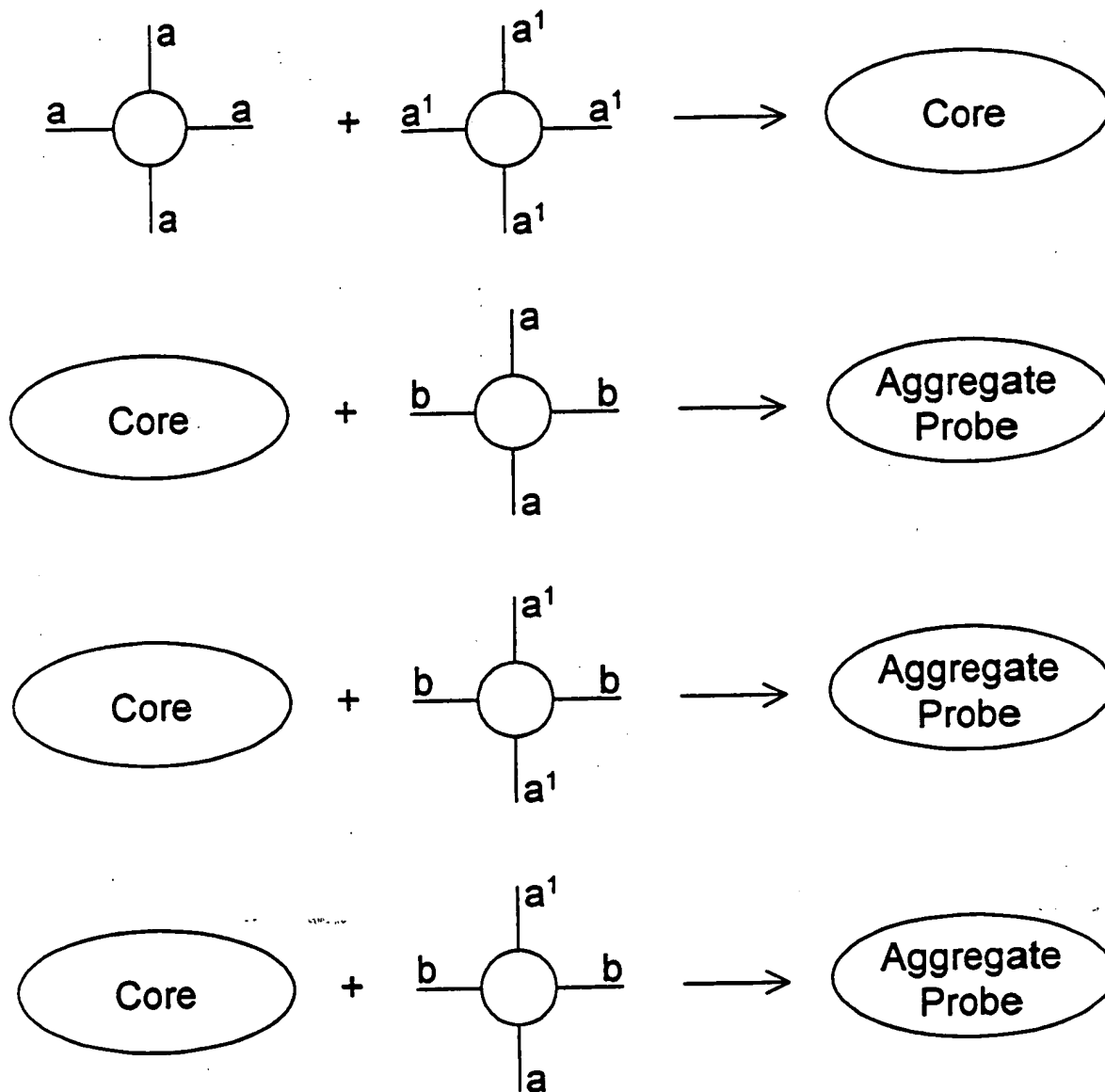


FIG. 28B

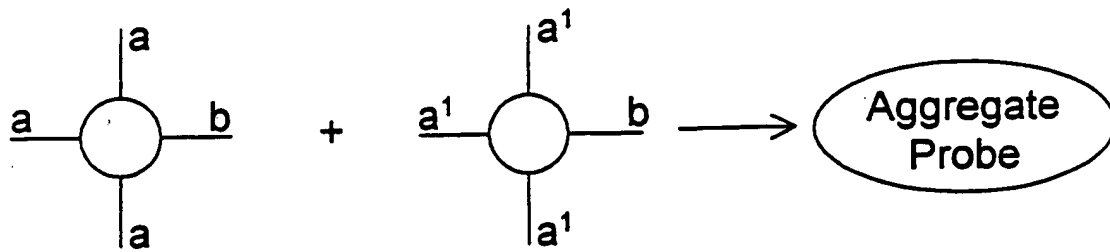


FIG. 28C

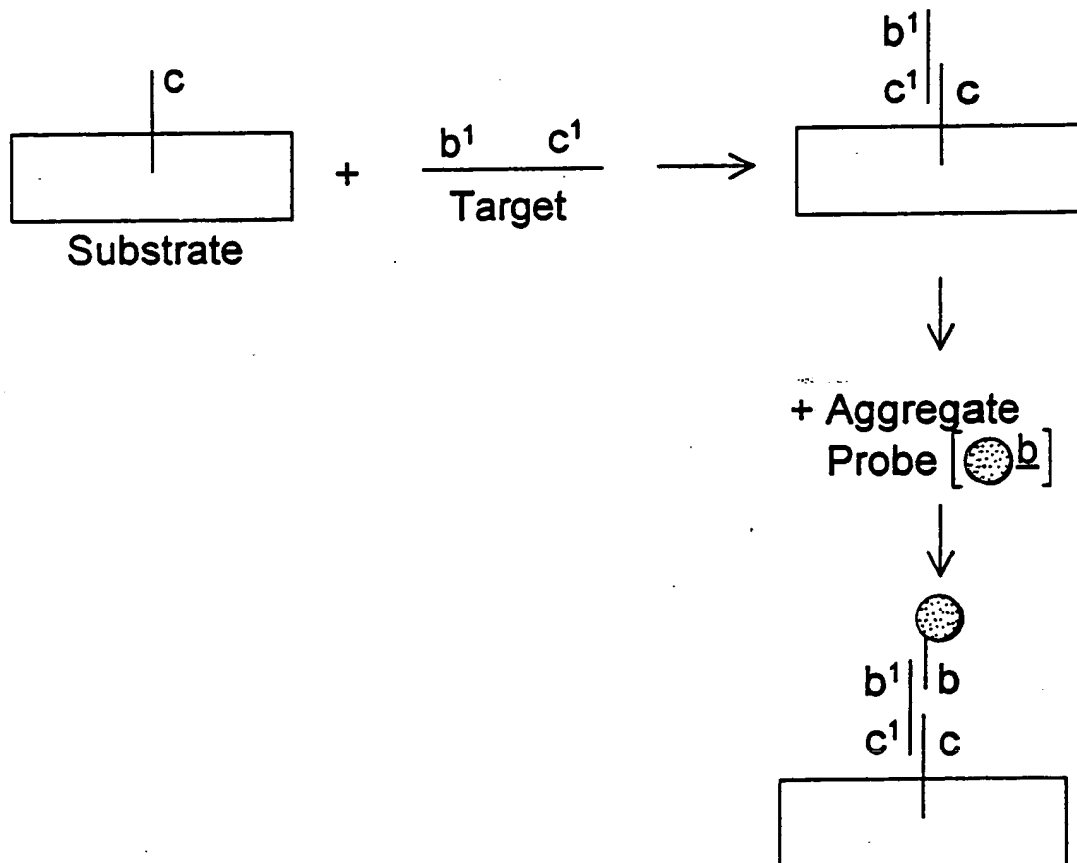




FIG. 28D

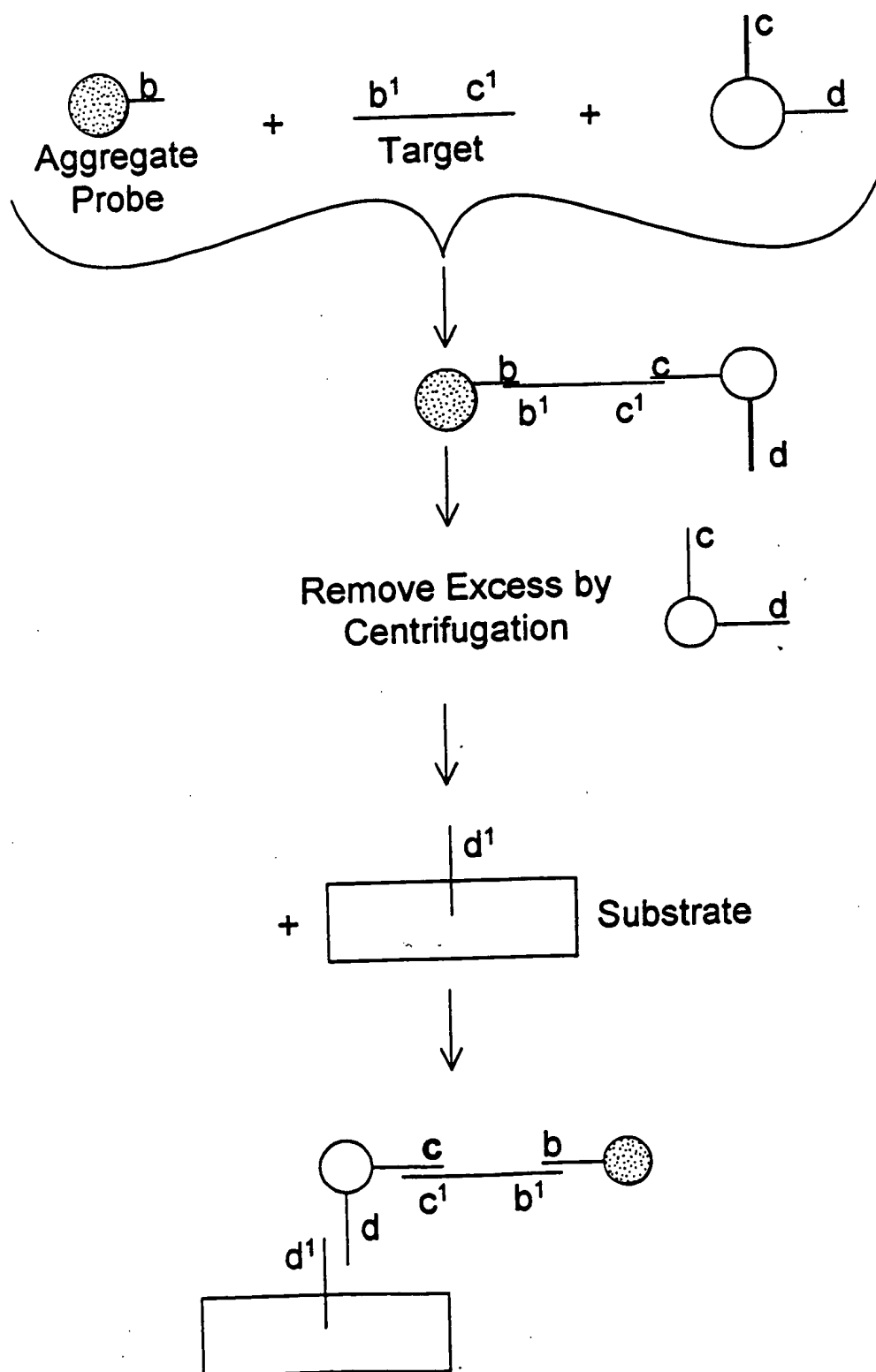
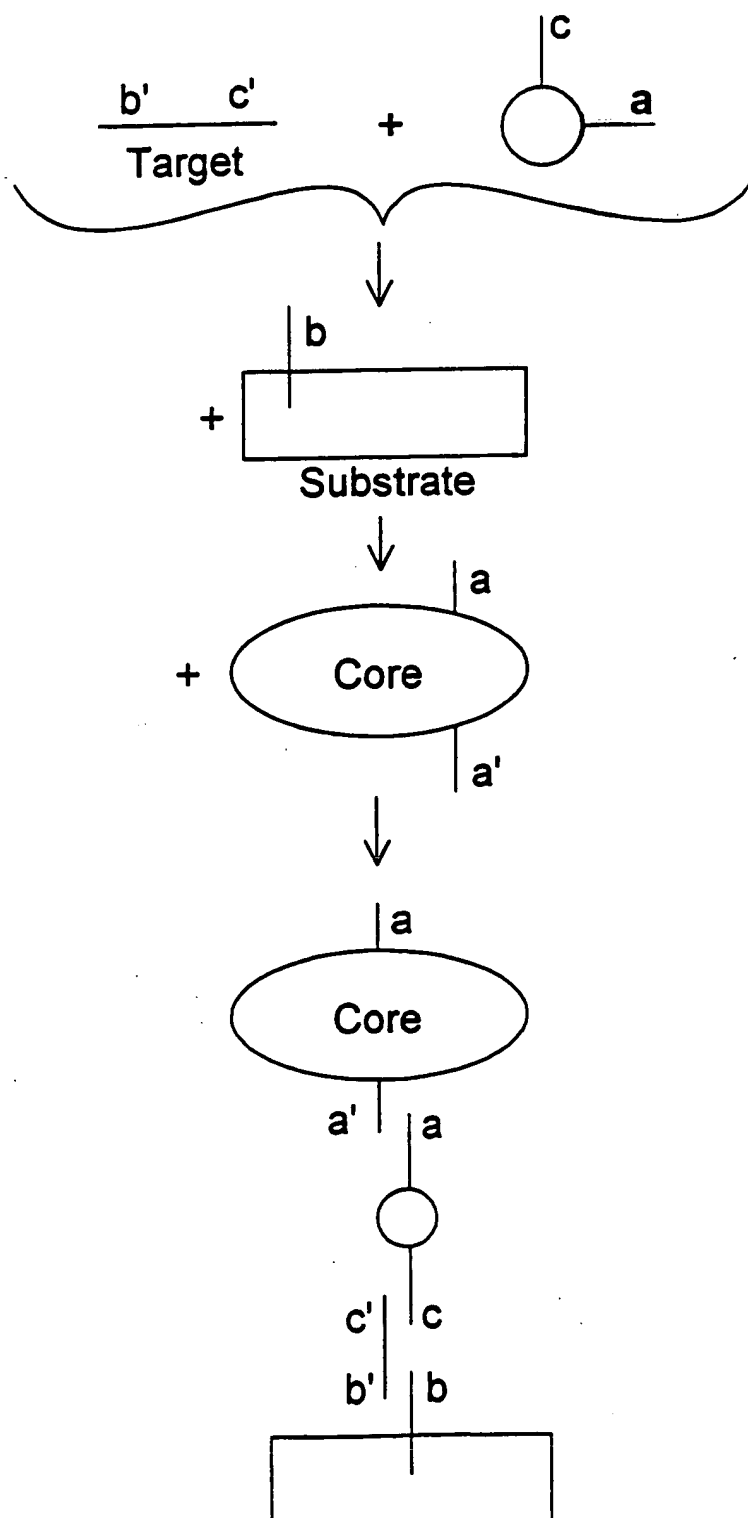


FIG. 28E



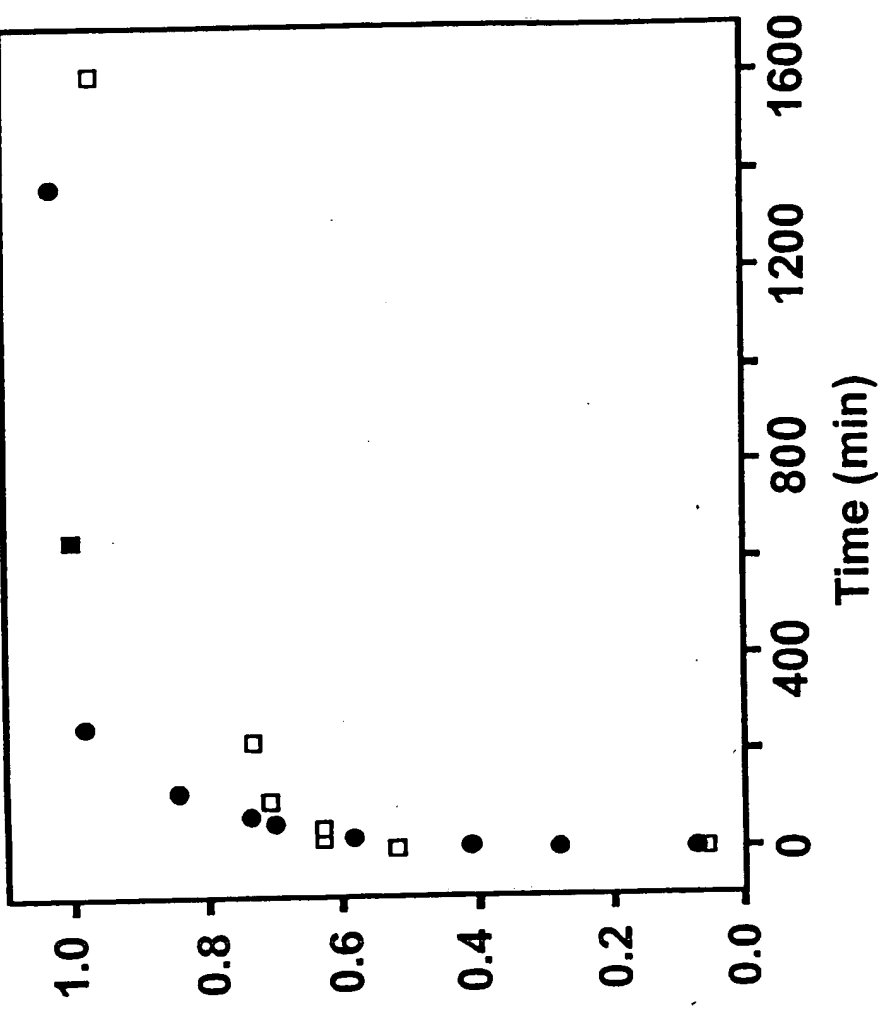


FIG. 29

Fractional Displacement by ME

FIG. 30

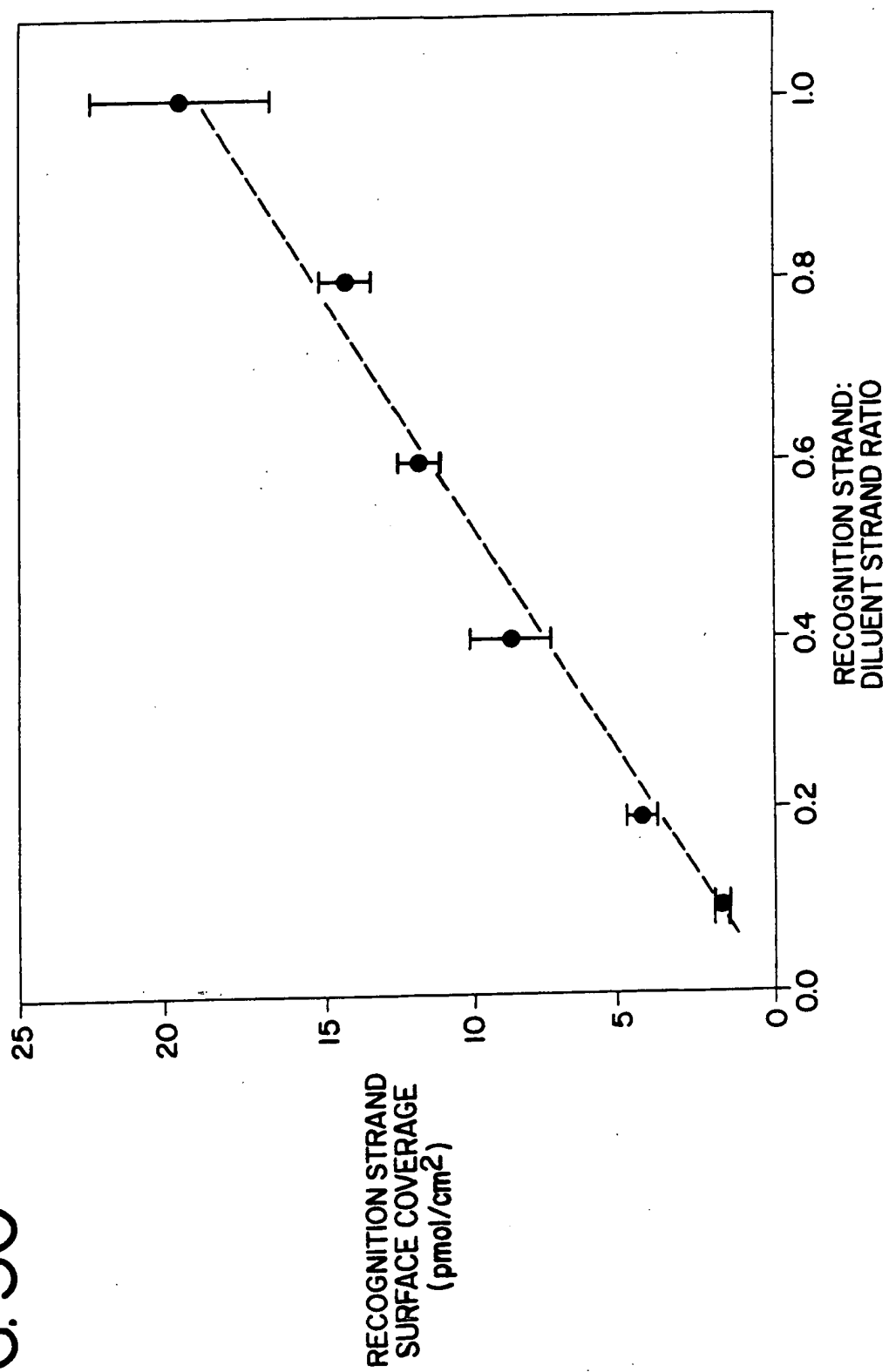
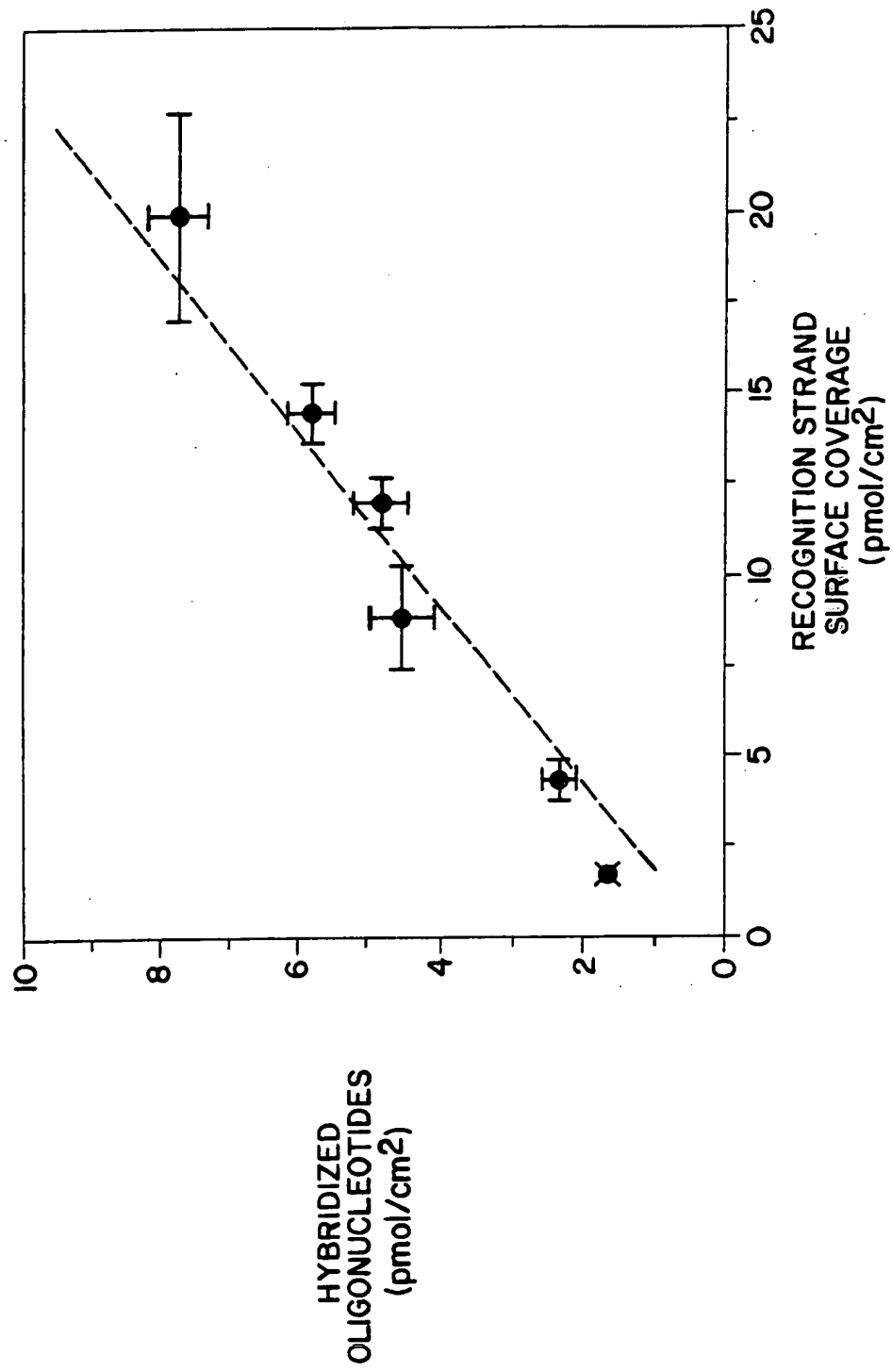
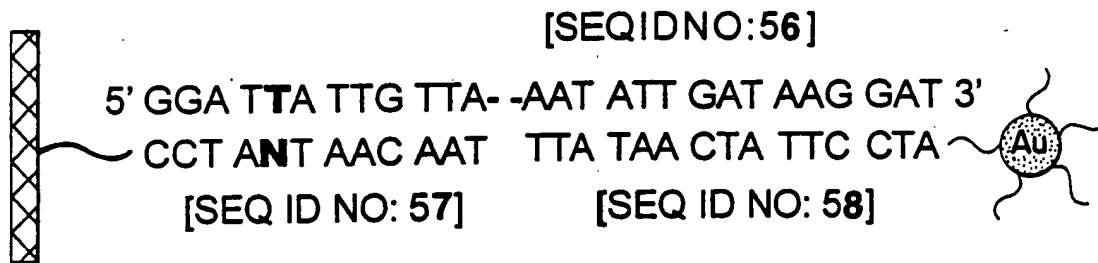


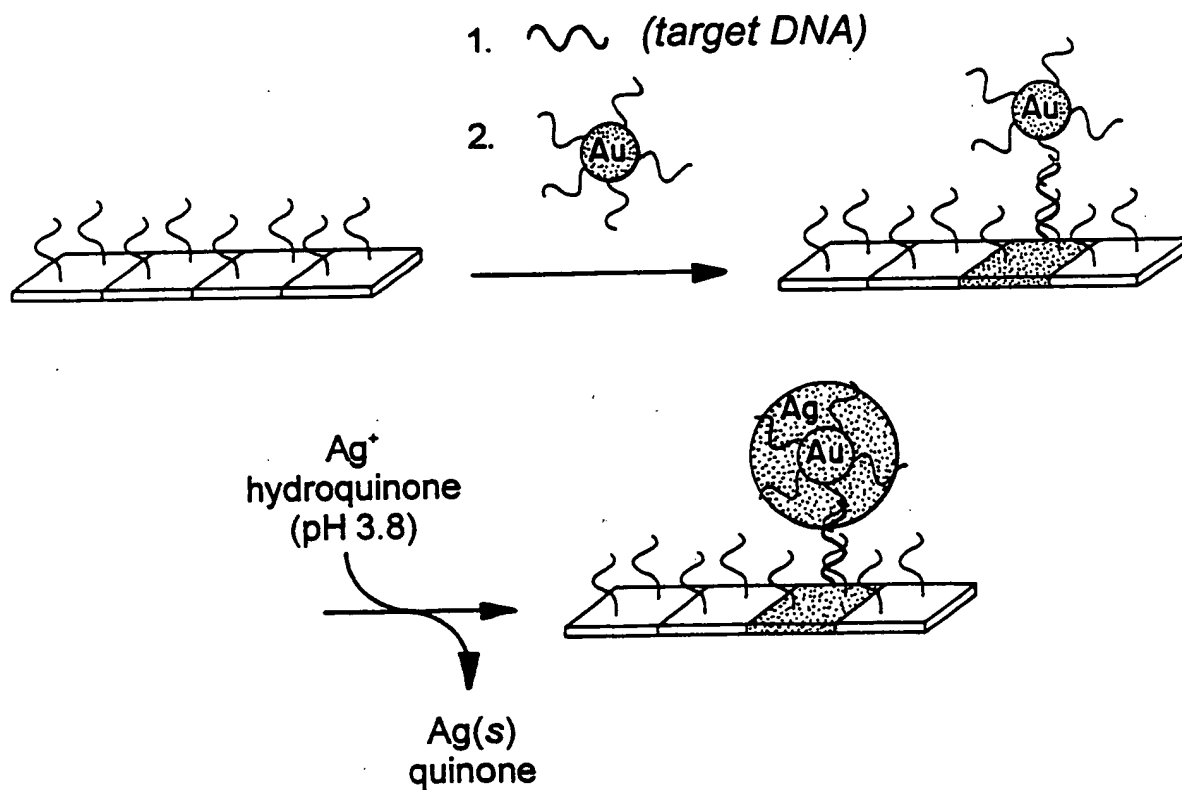
FIG. 31



# FIG. 32



**N** = A (complementary),  
G,C,T (mismatched)



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FIG. 33



**A**



**B**



**C**



**D**



**E**



**F**



**G**

FIG. 34

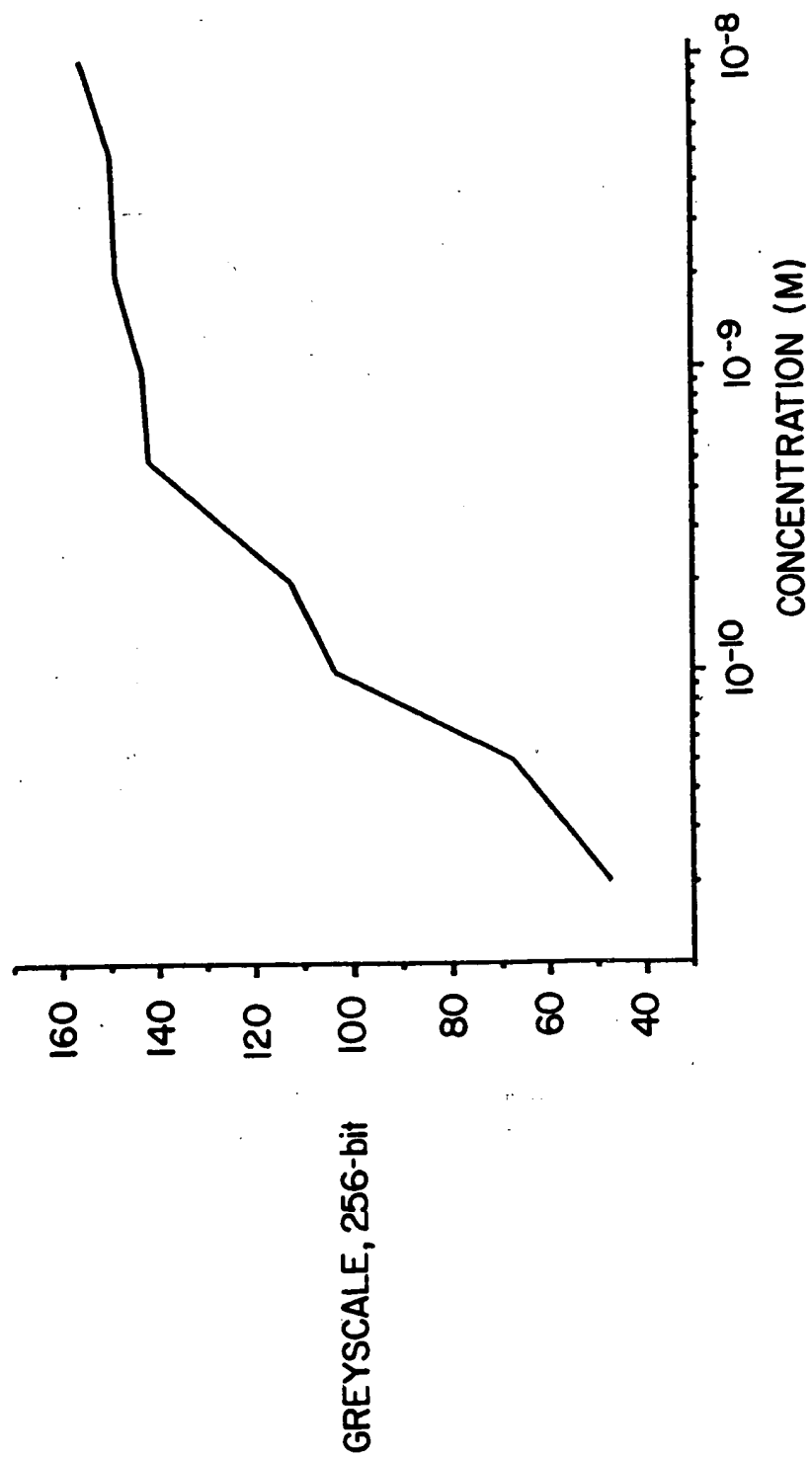




FIG.35A

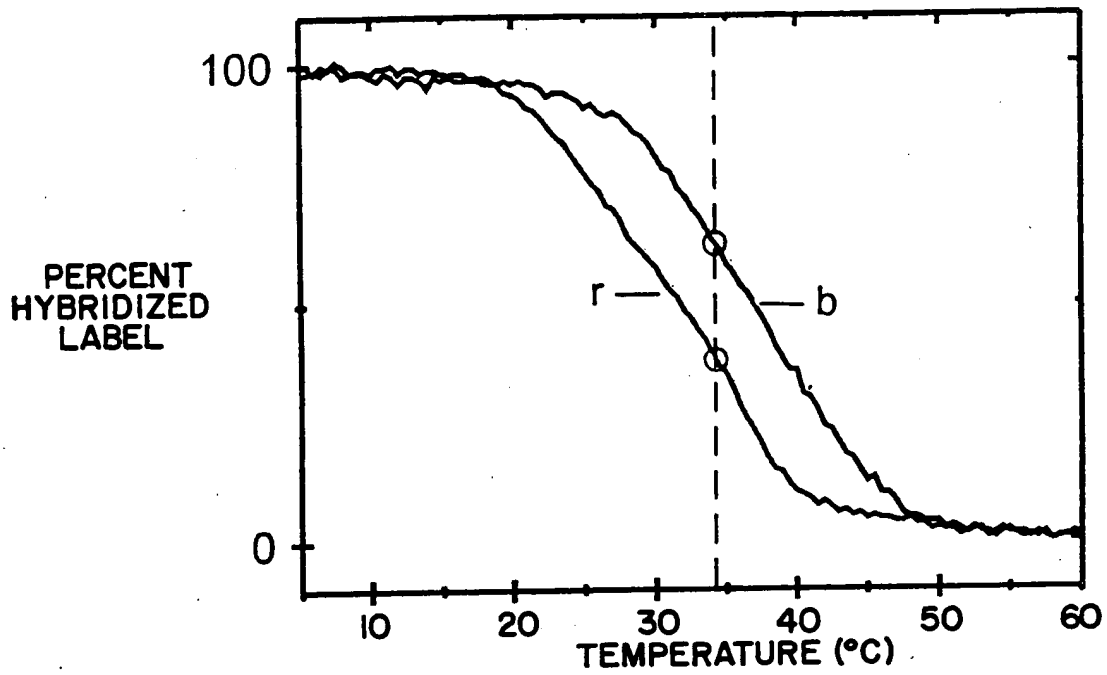
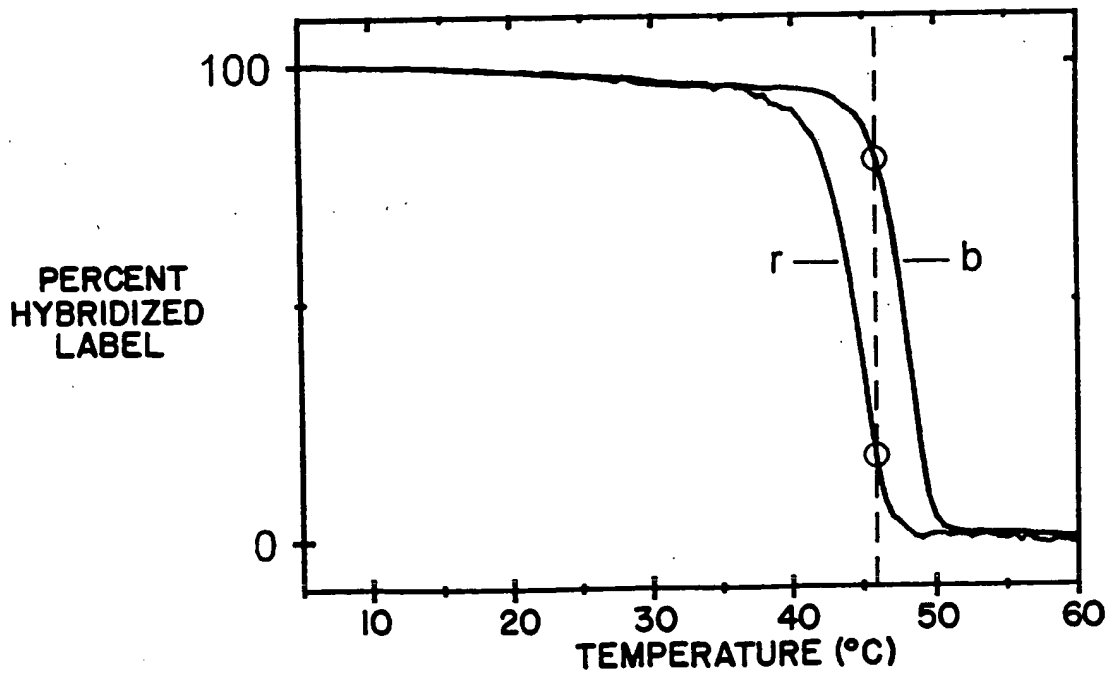


FIG.35B



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FIG. 36A

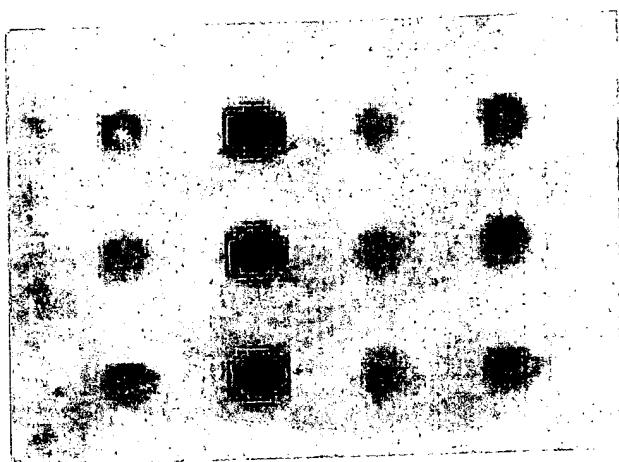
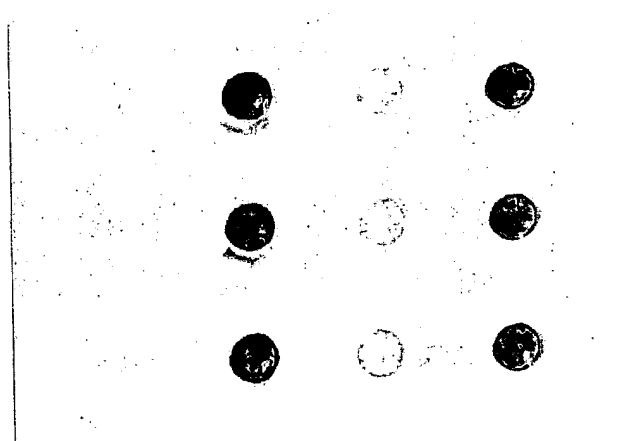


FIG. 36B



C A T G

FIG.37A

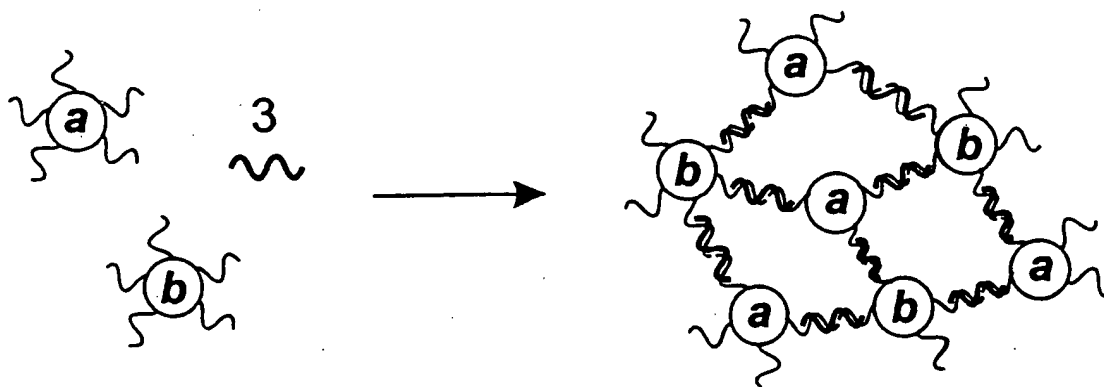


FIG.37B

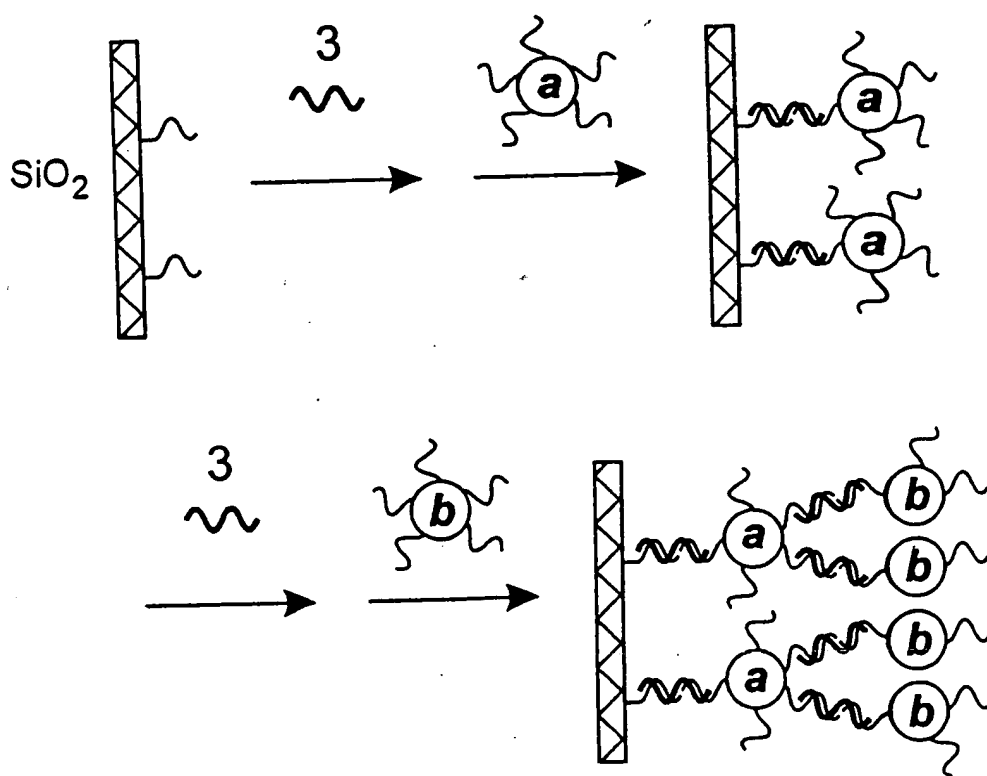


FIG.38A

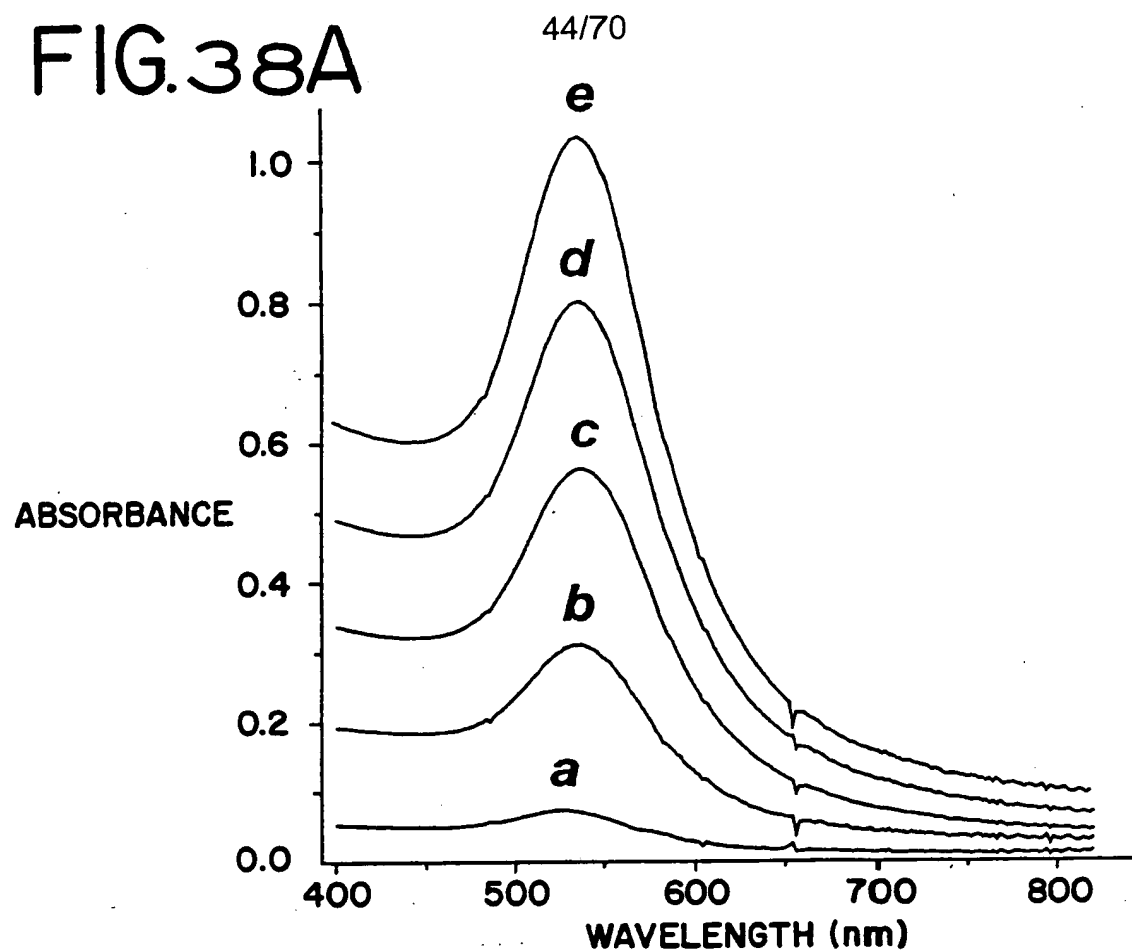


FIG.38B

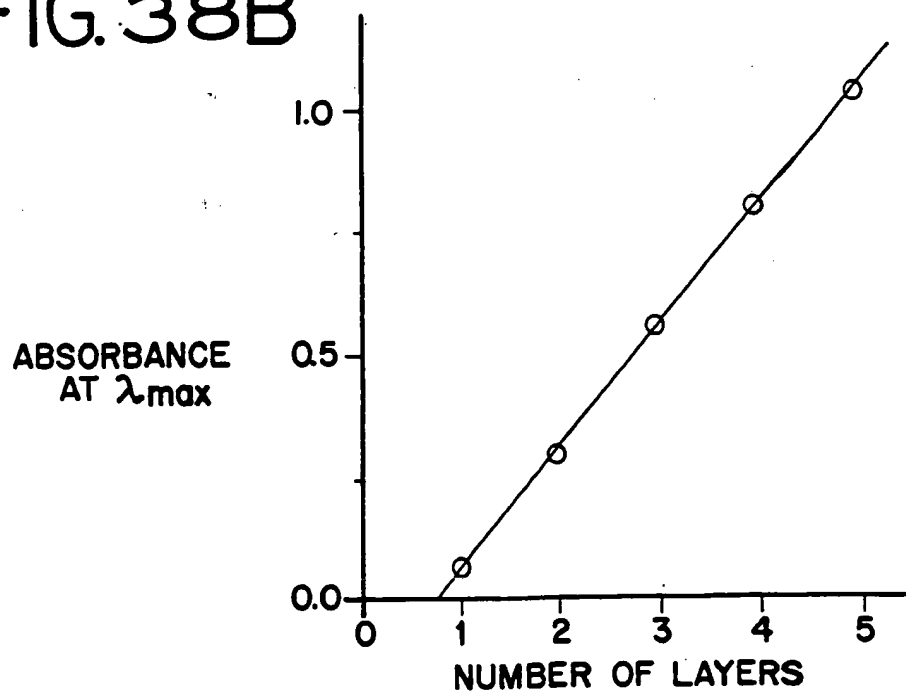


FIG. 39A

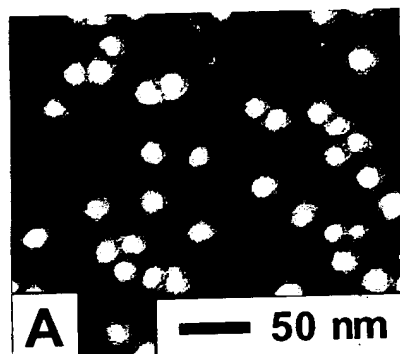


FIG. 39B

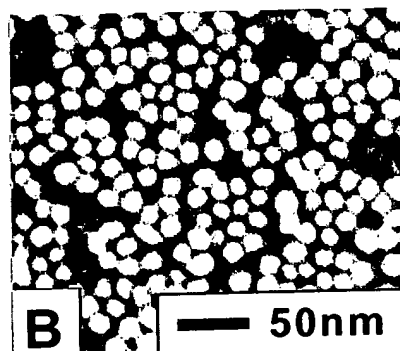


FIG.39C

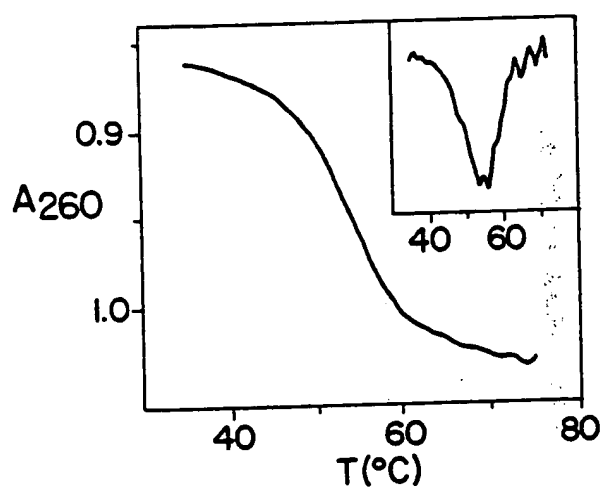


FIG.39D

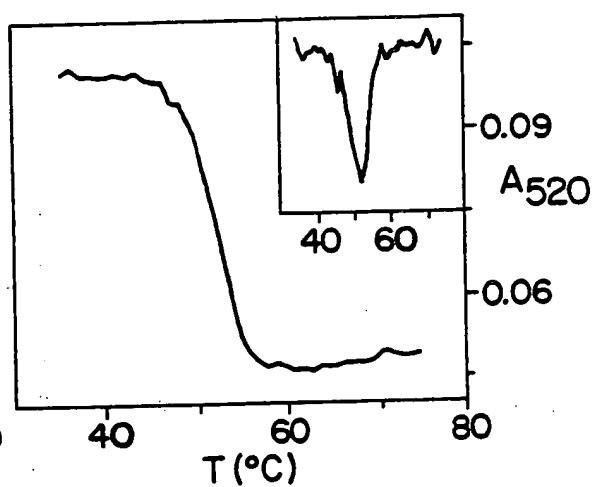


FIG.39E

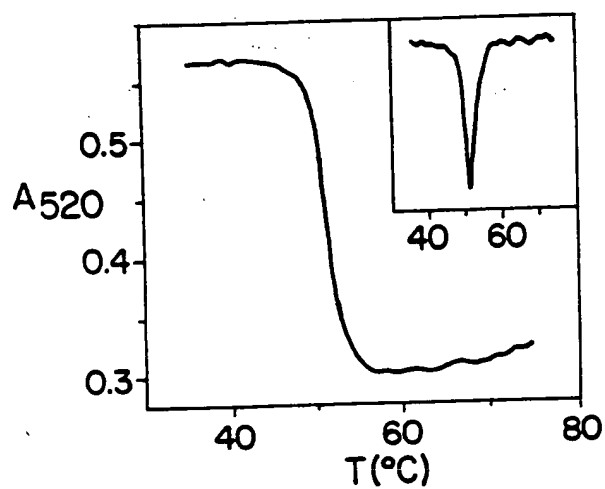


FIG.39F

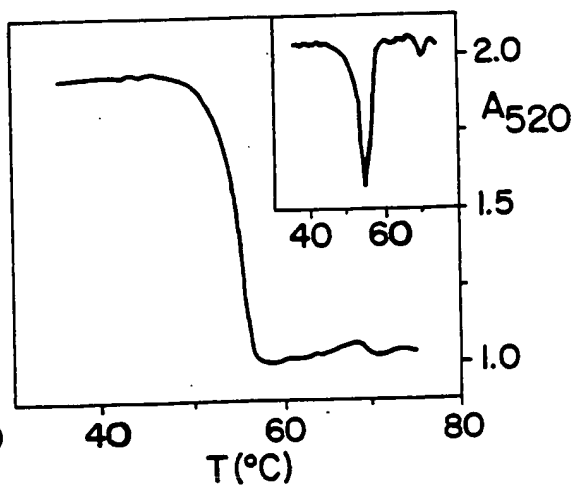


FIG. 40

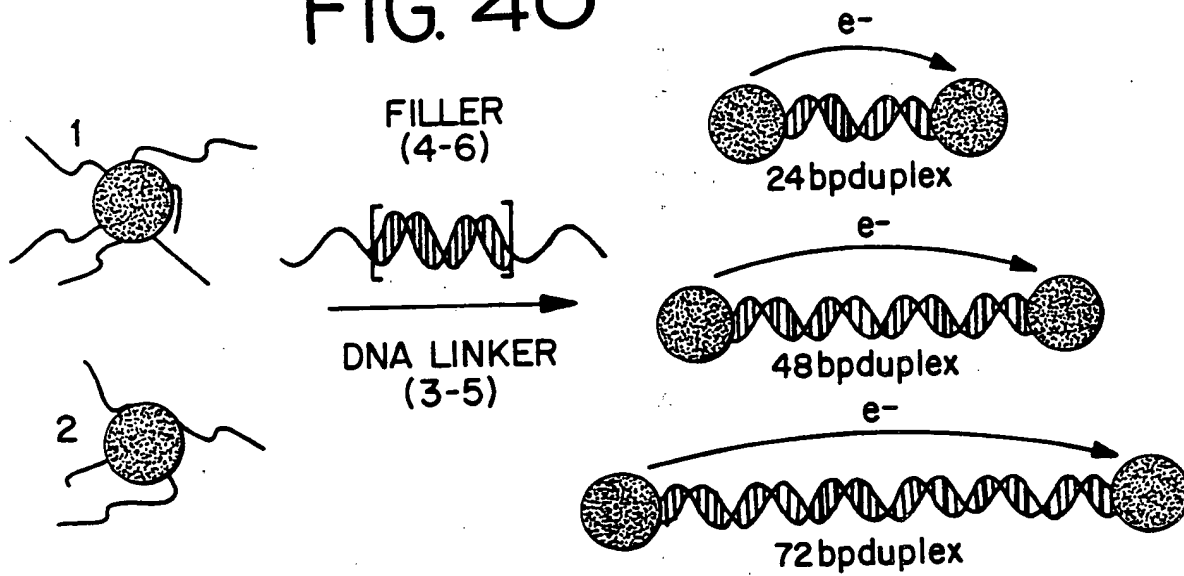
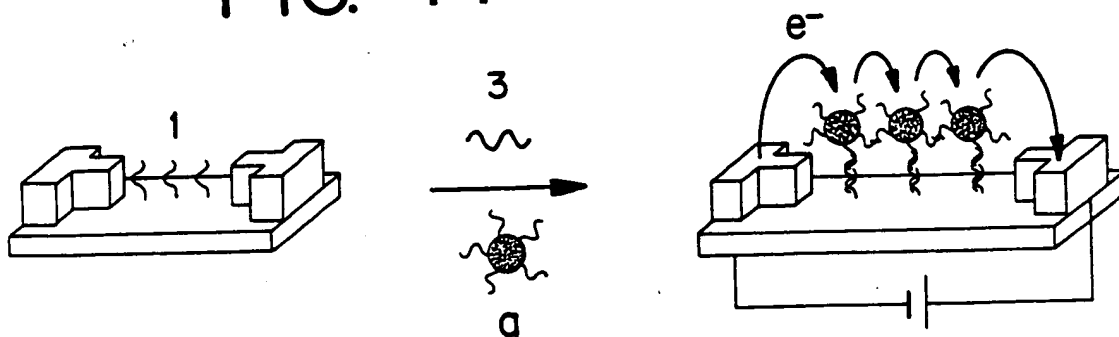
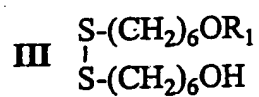
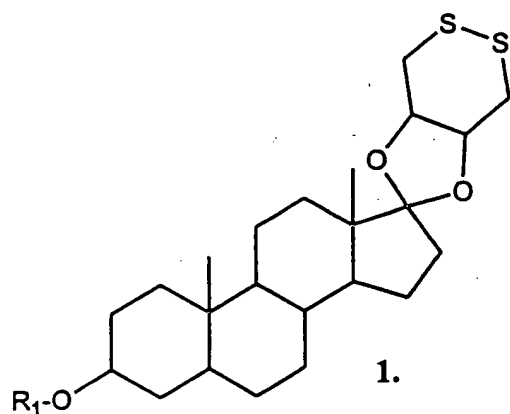


FIG. 41



# FIG. 42



R<sub>1</sub>

a = H

b = (iPr)<sub>2</sub>NP(OCH<sub>2</sub>CH<sub>2</sub>CN)-

c1 = 5'-p(A<sub>20</sub>)-TATCGTTCCATCAGCT [SEQ ID NO: 65]

c2 = 5'-p(A<sub>20</sub>)-TTGATCTTCCGTTCT [SEQ ID NO: 66]

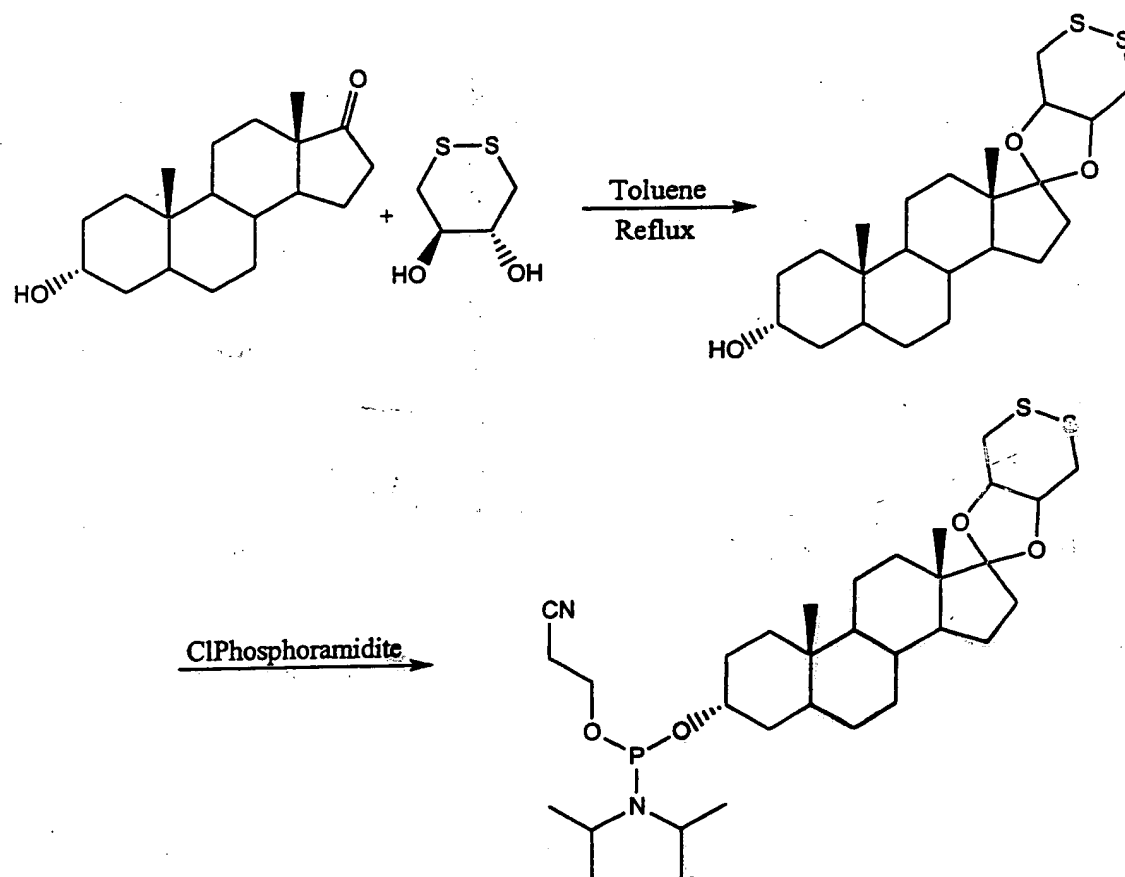
Target I = 79-mer oligonucleotide with target region:

3'-.....ATAGCAAGGTAGTCGAGCAACTAGAAAGGCAAGA.....5'  
[SEQ ID NO: 67]



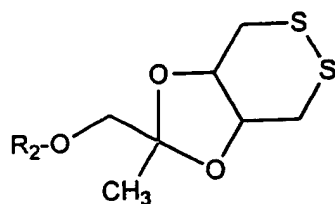
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# FIG. 43



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# FIG. 44



2.

R<sub>2</sub>

a = H

b = (iPr)<sub>2</sub>NP(OCH<sub>2</sub>CH<sub>2</sub>CN)-

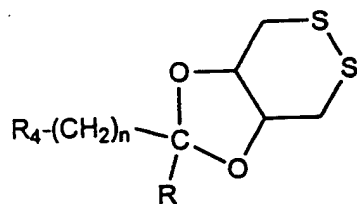
c1 = 5'-p(A<sub>20</sub>)-GCAGACCTCA [SEQ ID NO: 68]

c2 = 5'-p(A<sub>20</sub>)-CCTATGTGTCG [SEQ ID NO: 69]

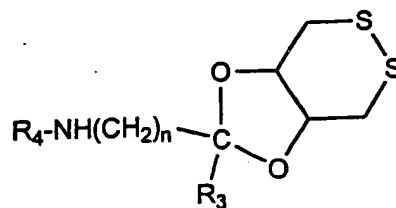
D = 5'-p(A<sub>20</sub>) [SEQ ID NO: 70]

Target I = 63-mer oligonucleotide with target region:

3'-.....CGTCTGGAGTGGATACACAGC.....5'  
[SEQ ID NO: 71]



3.

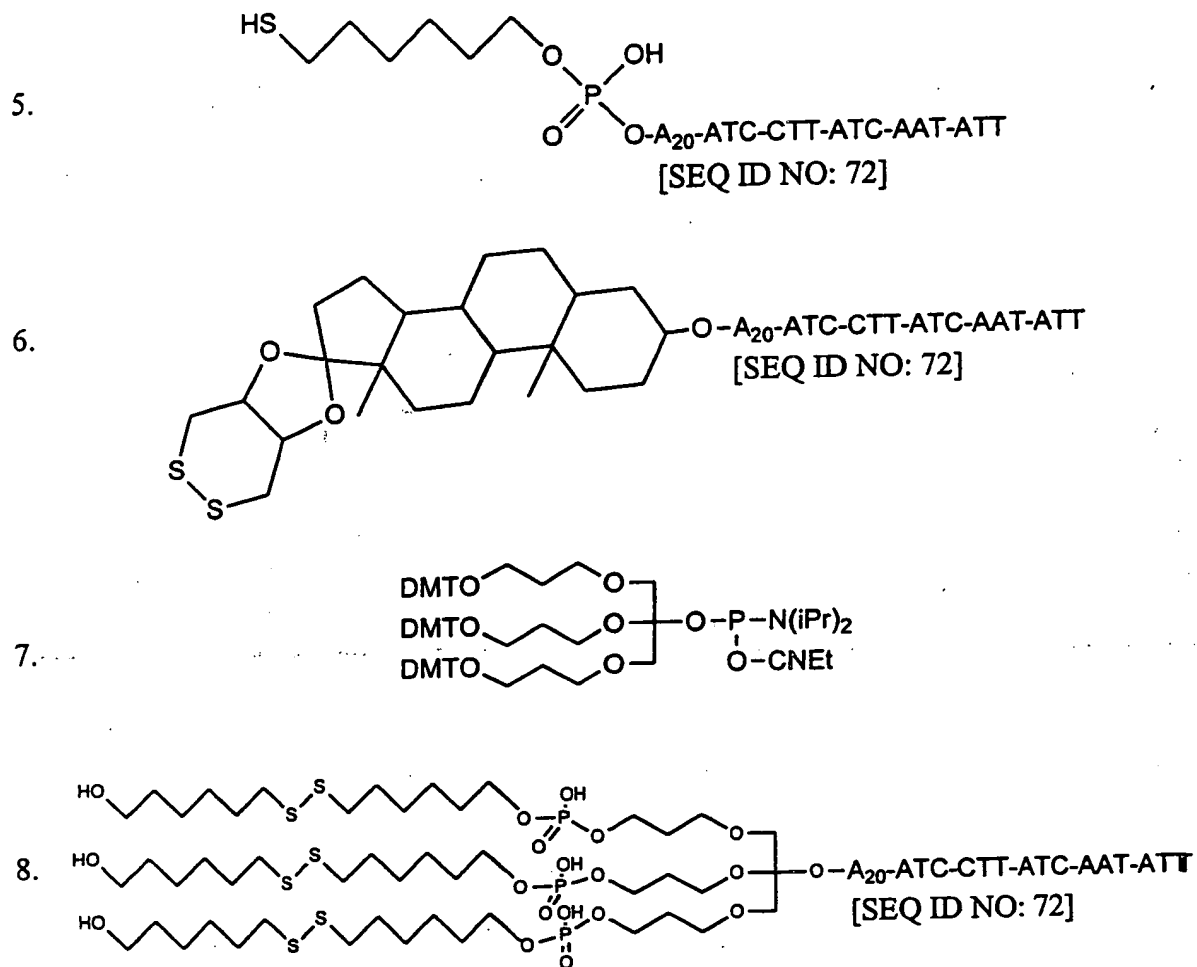


4.

R<sub>3</sub> = hydrogen, an alkyl group, an aryl group, or a substituted alkyl or aryl group

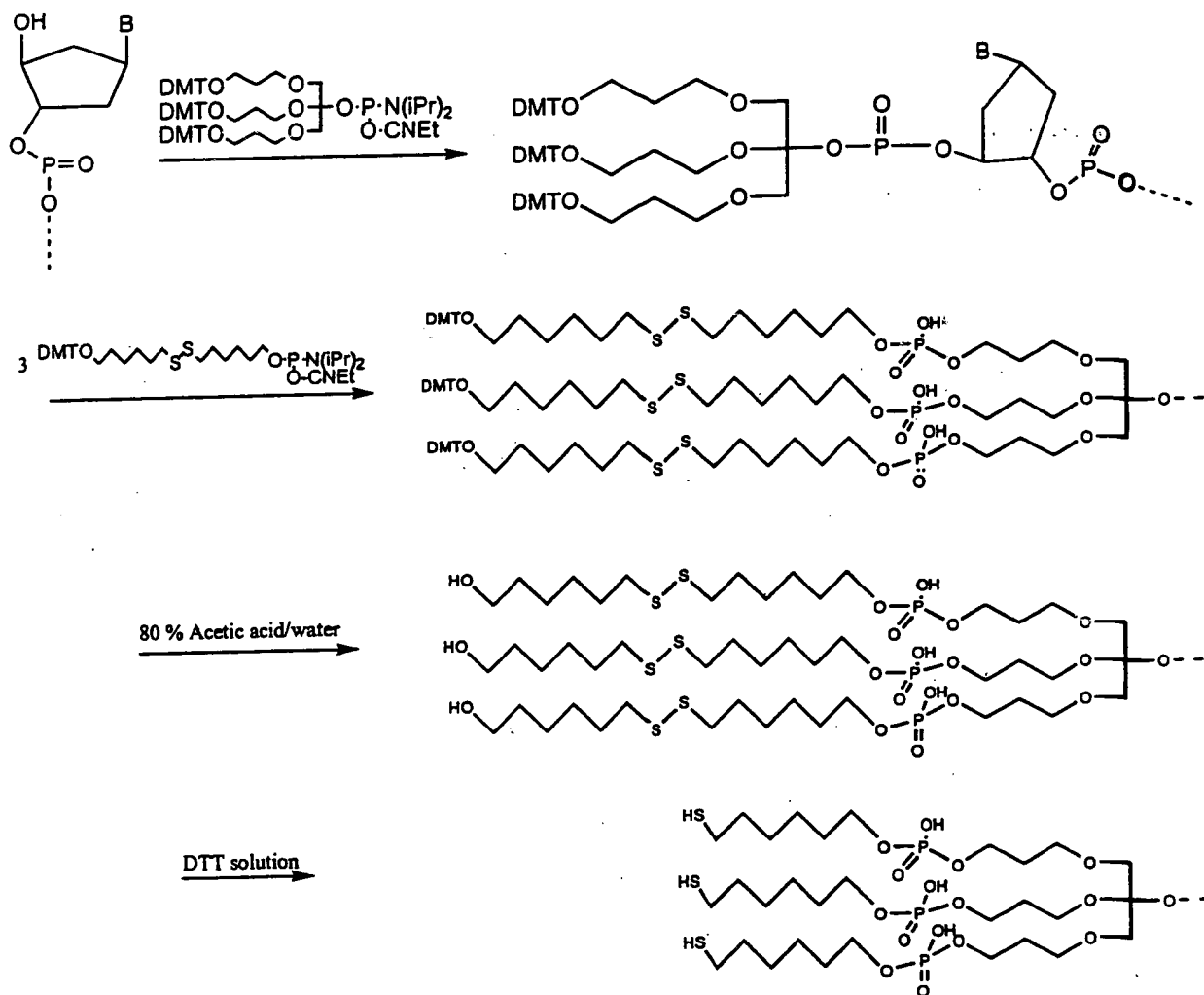
R<sub>4</sub> = an attached oligonucleotide or modified oligonucleotide

## FIG. 45



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FIG. 46



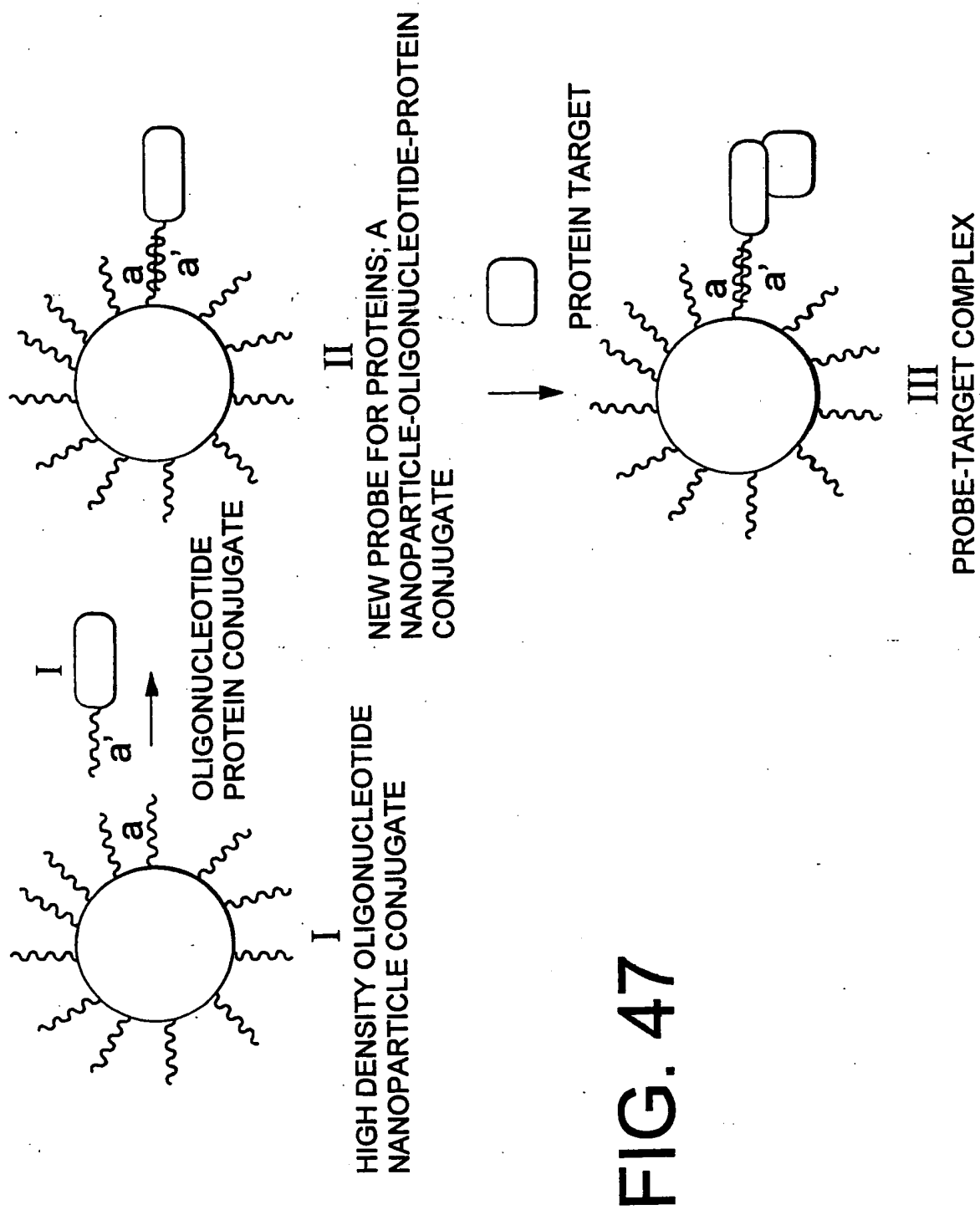
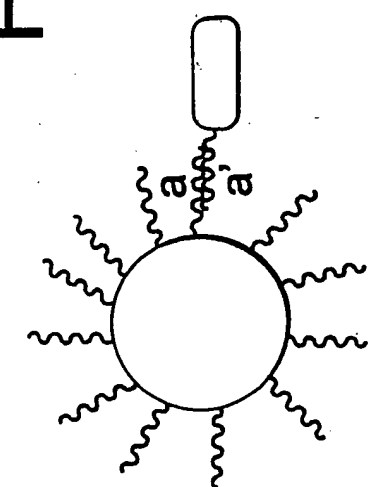


FIG. 47

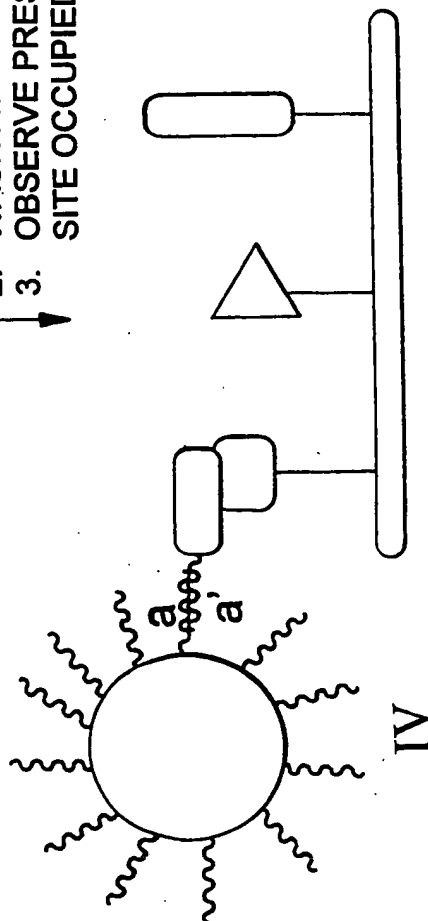
FIG. 48



II

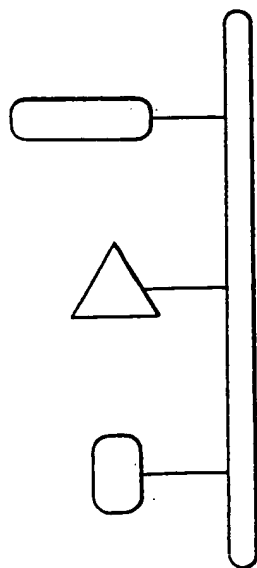
NEW PROBE FOR PROTEINS; A  
NANOPARTICLE-OLIGONUCLEOTIDE-PROTEIN  
CONJUGATE

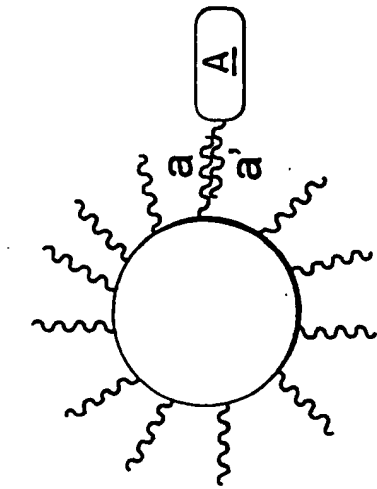
1. EXPOSE PLATE TO THE PROBE SOLUTION
2. WASH AWAY UNBOUND NANOPARTICLE PROBE
3. OBSERVE PRESENCE OF BOUND NANOPARTICLES AT  
SITE OCCUPIED BY THE FIRST PROTEIN IN THE SERIES.



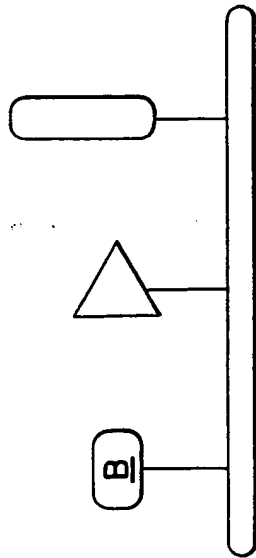
IV

GLASS PLATE WITH THREE DIFFERENT PROTEINS  
IMMOBLIZED ON THE SURFACE, ONE OF WHICH  
BINDS TO THE PROTEIN IN PROBE II





II'  
NANOPARTICLE-OLIGONUCLEOTIDE-RECEPTOR



GLASS PLATE WITH THREE DIFFERENT SUBSTANCES  
IMMOBILIZED ON THE SURFACE, ONE OF WHICH ( $\bar{B}$ )  
BINDS TO THE RECEPTOR UNIT ( $\bar{A}$ ) IN II'.

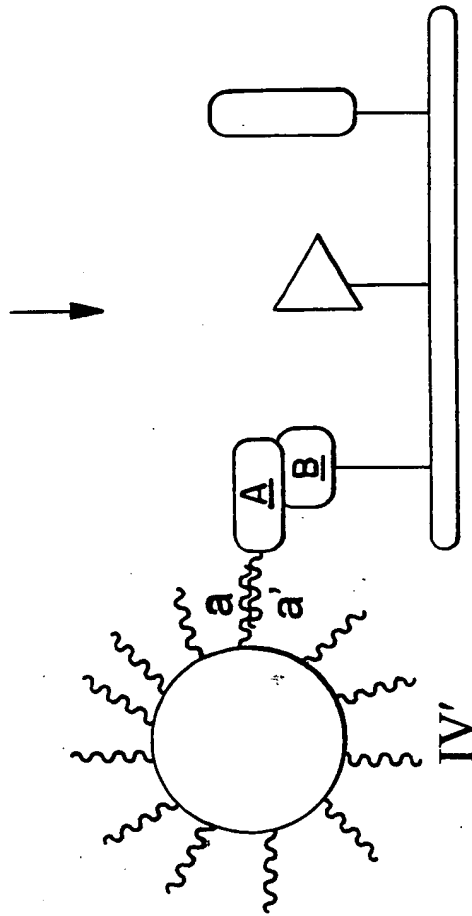


FIG. 49

FIG. 50A

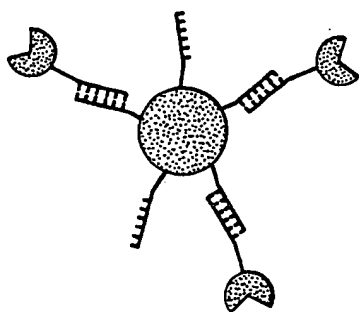


FIG. 50B

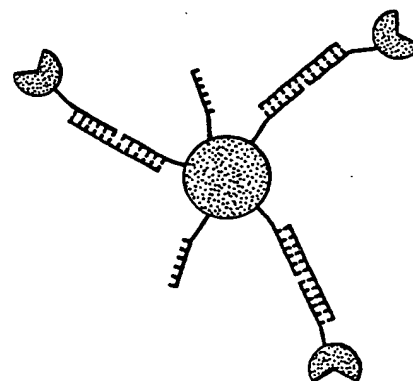


FIG. 51A

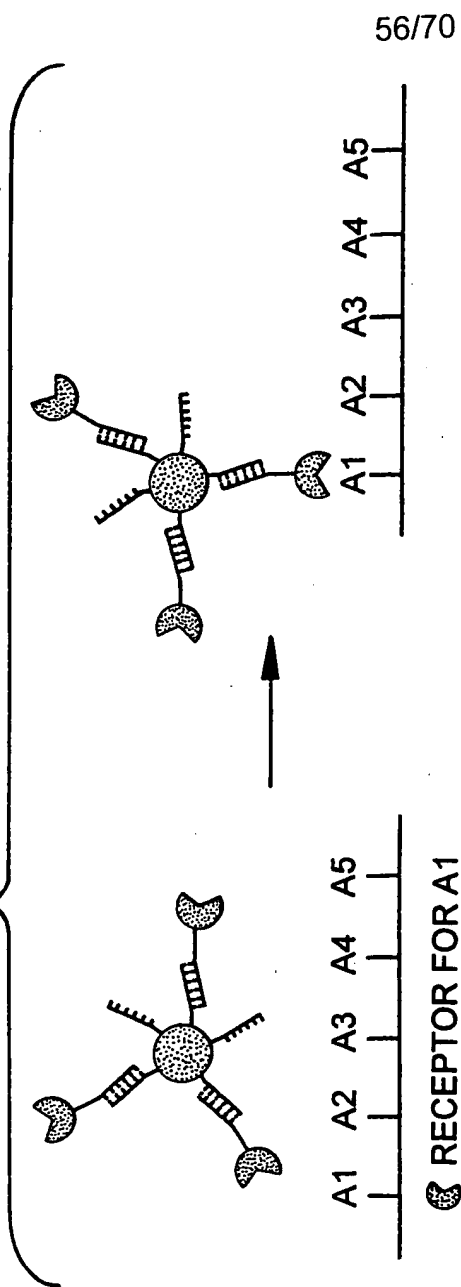


FIG. 51B

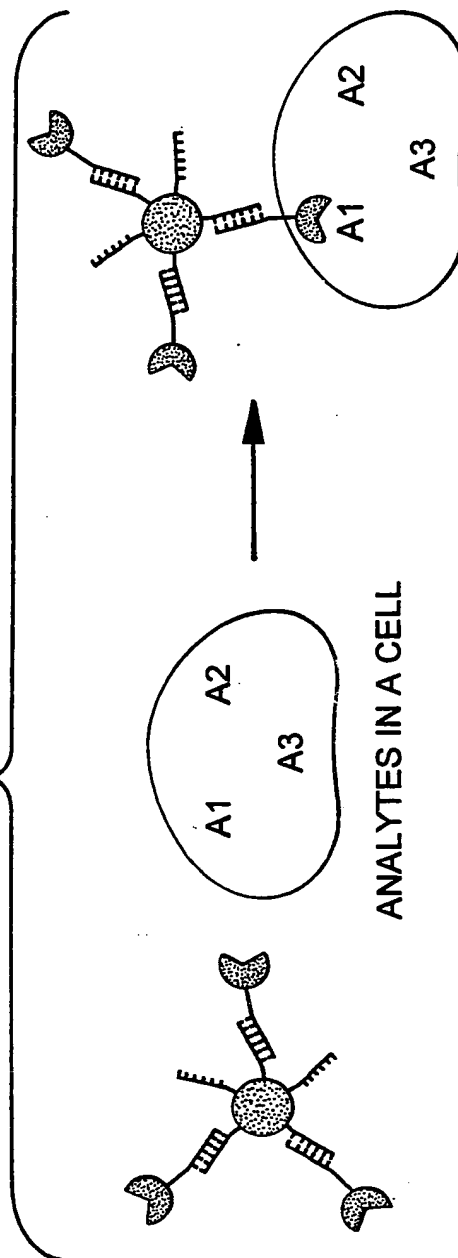




FIG. 52A

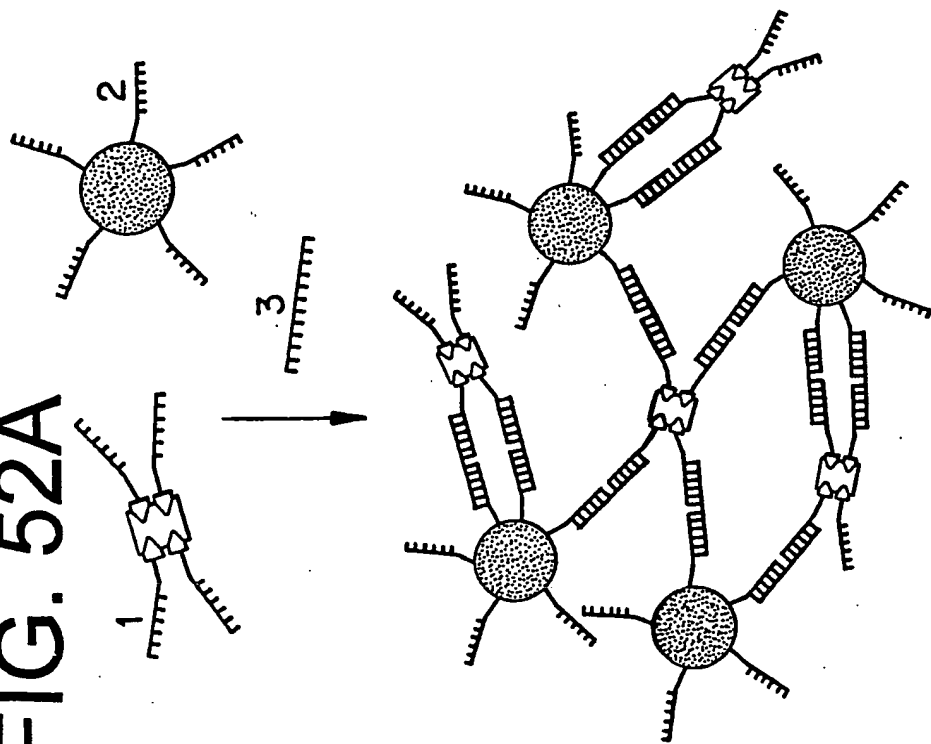
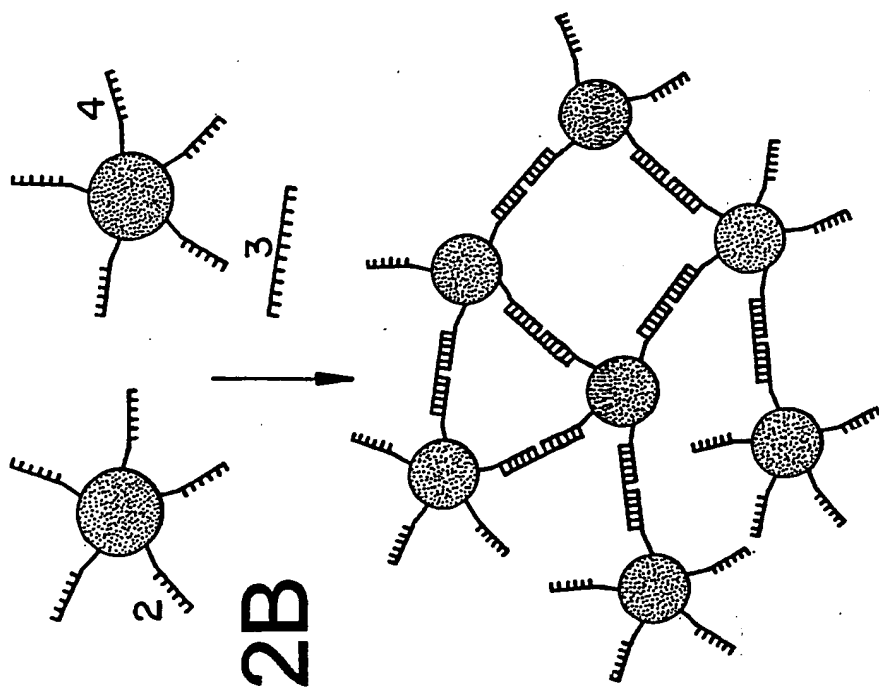
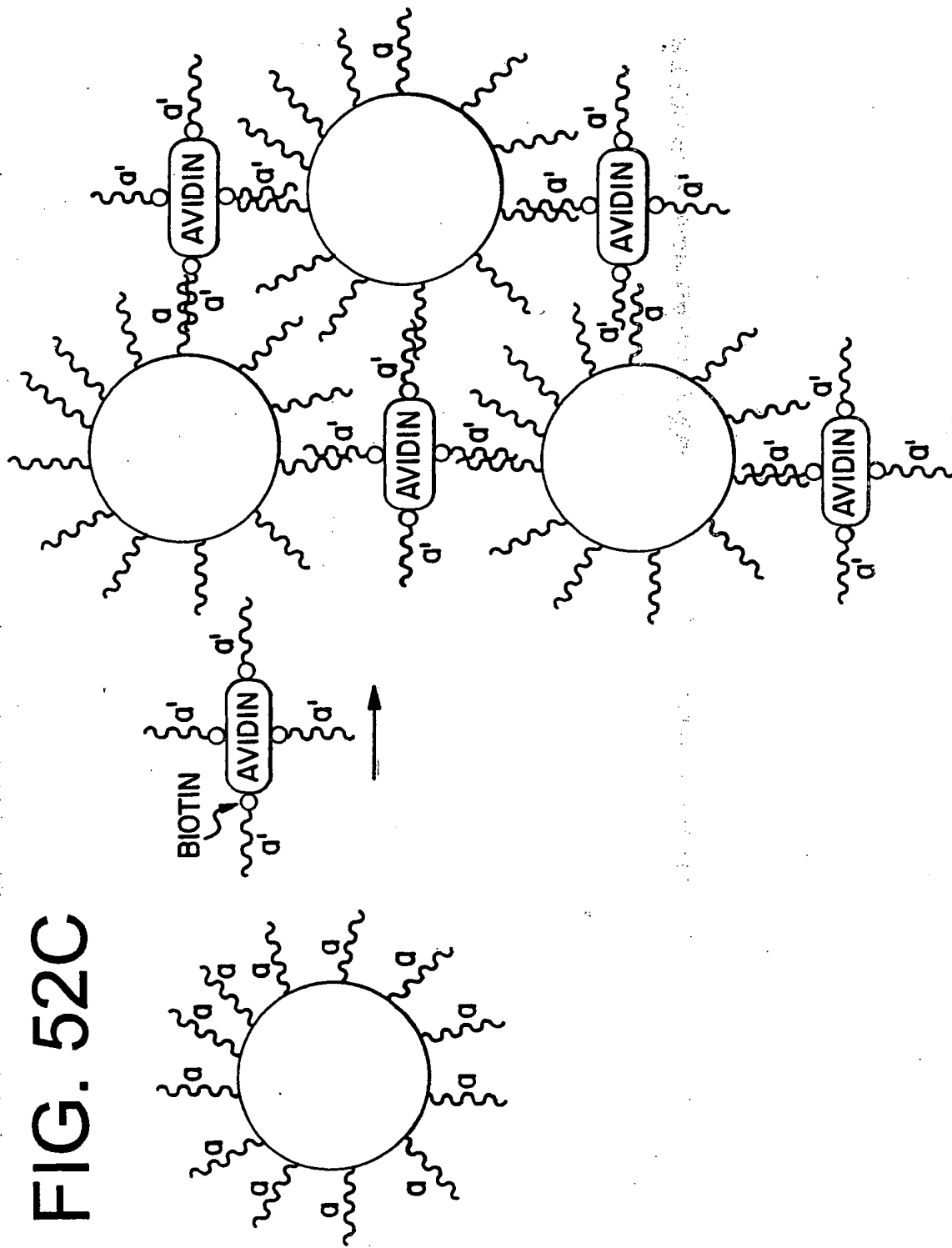


FIG. 52B



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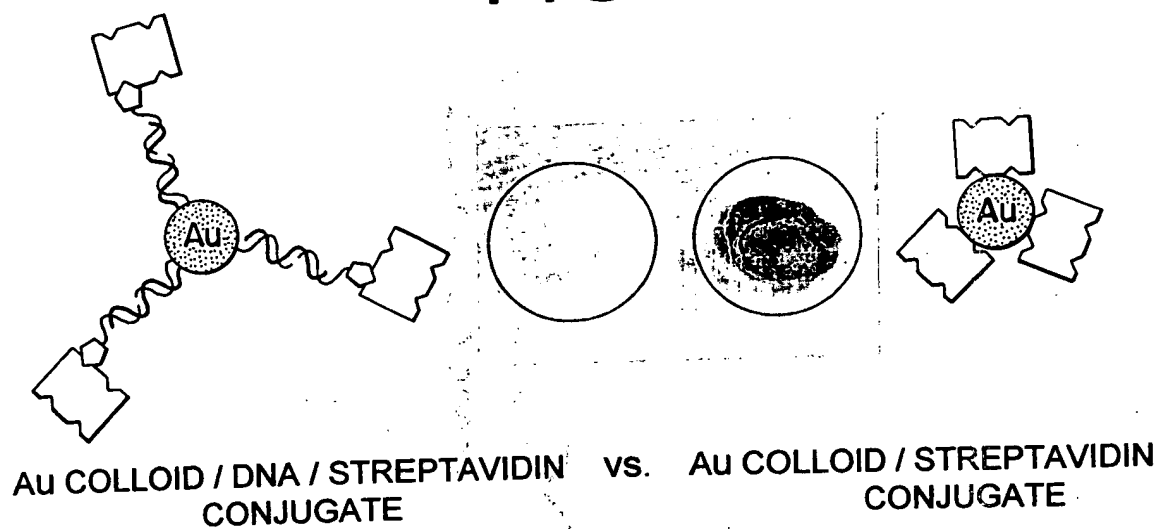
FIG. 52C



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# FIG. 53



# FIG. 54

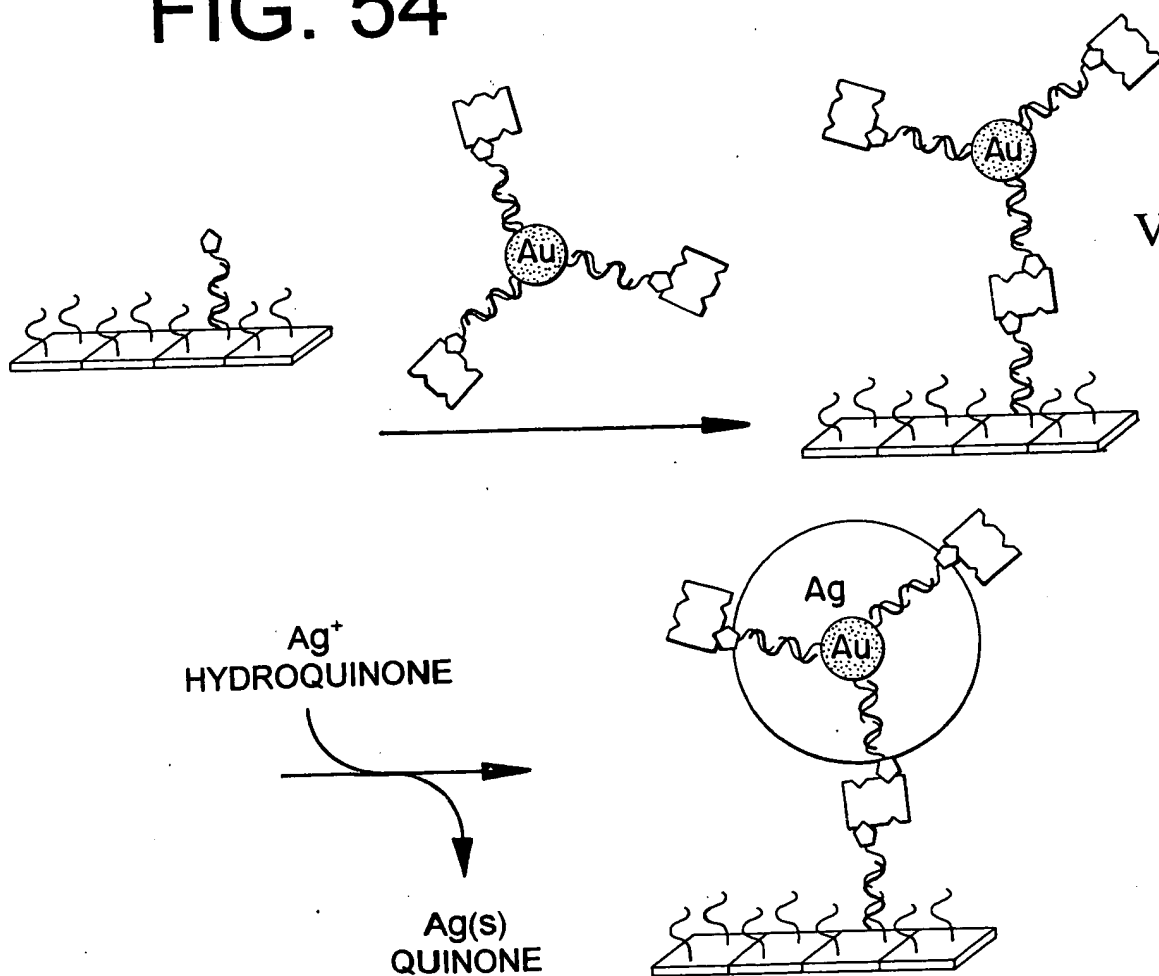


FIG. 55 <sup>60/70</sup>

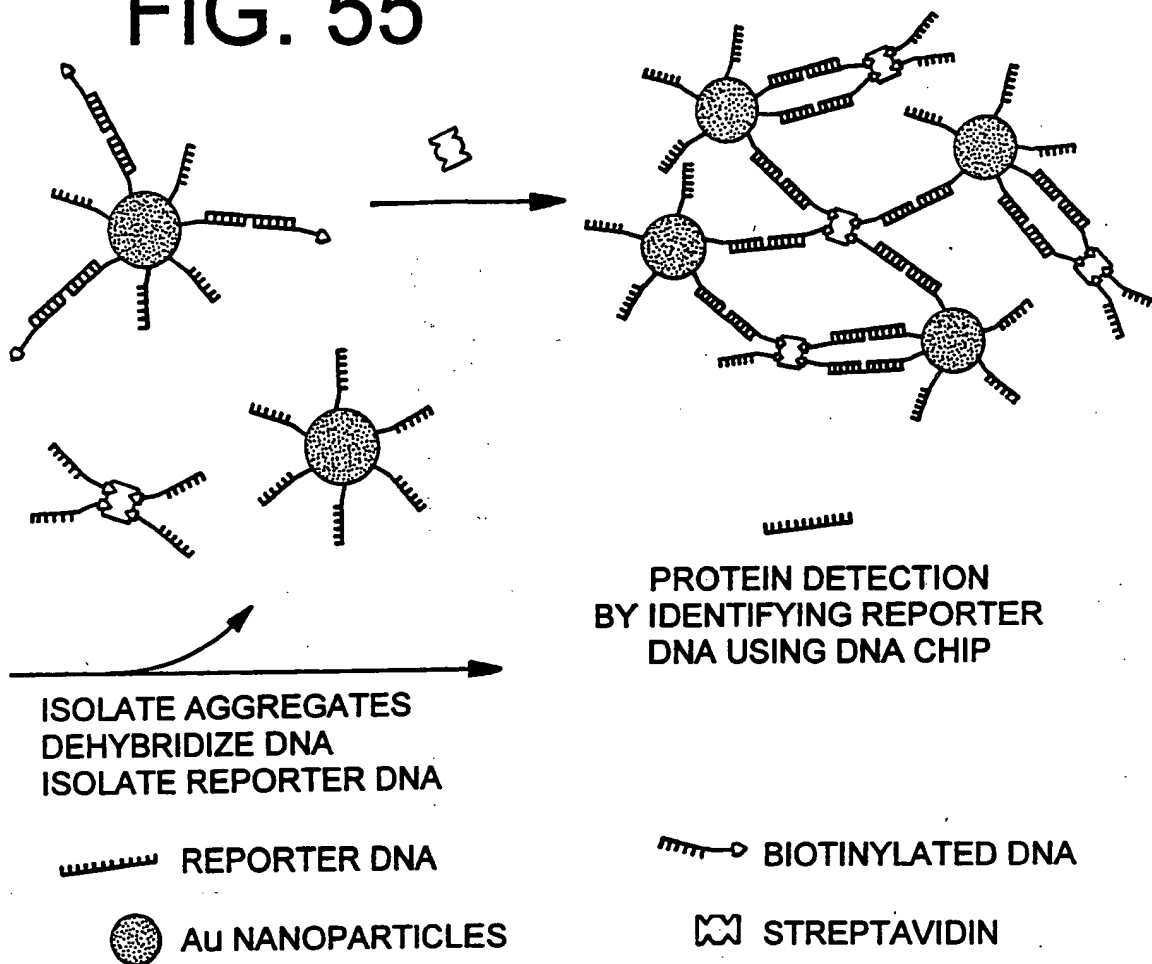
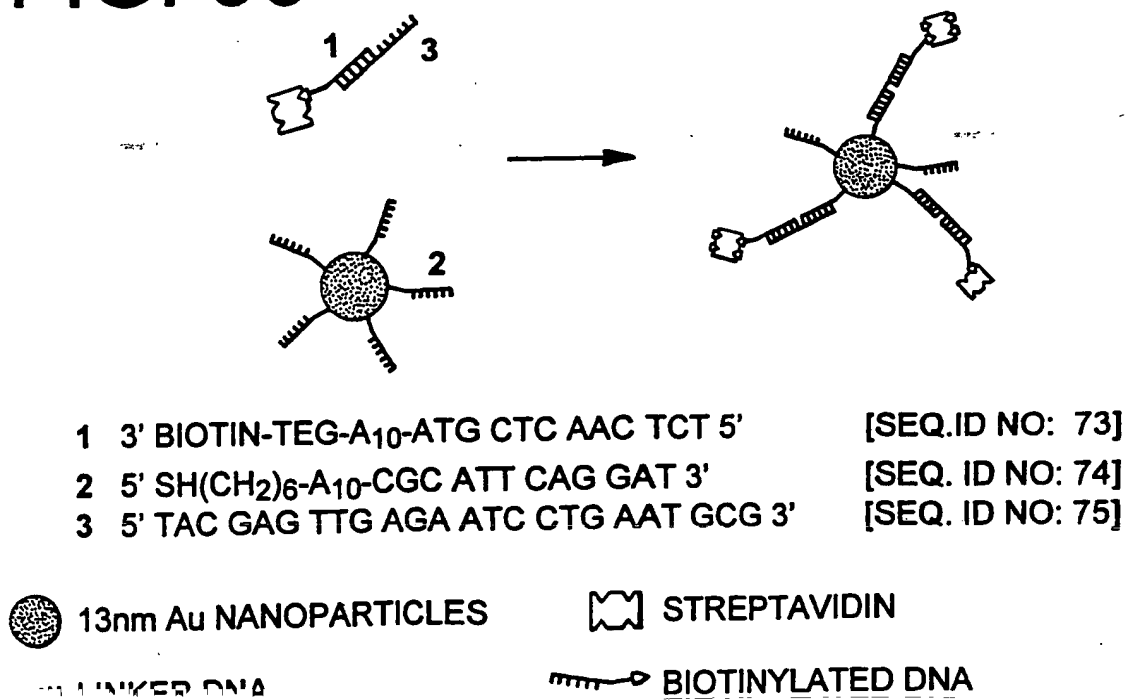


FIG. 56



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FIG.57A

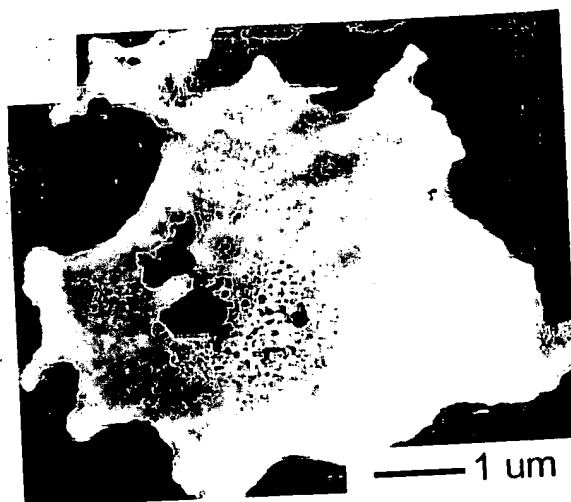
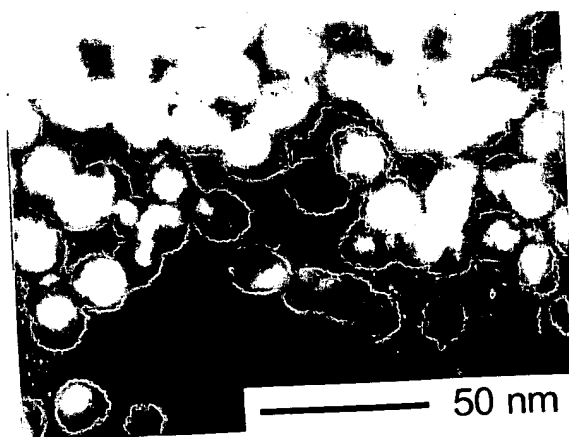
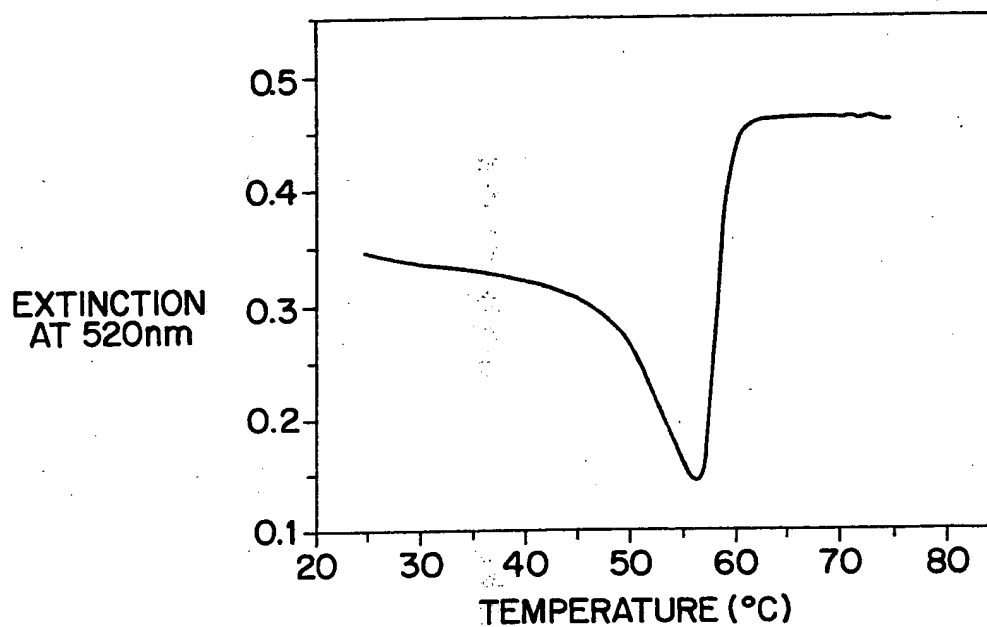


FIG.57B



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# FIG. 58A



# FIG. 58B

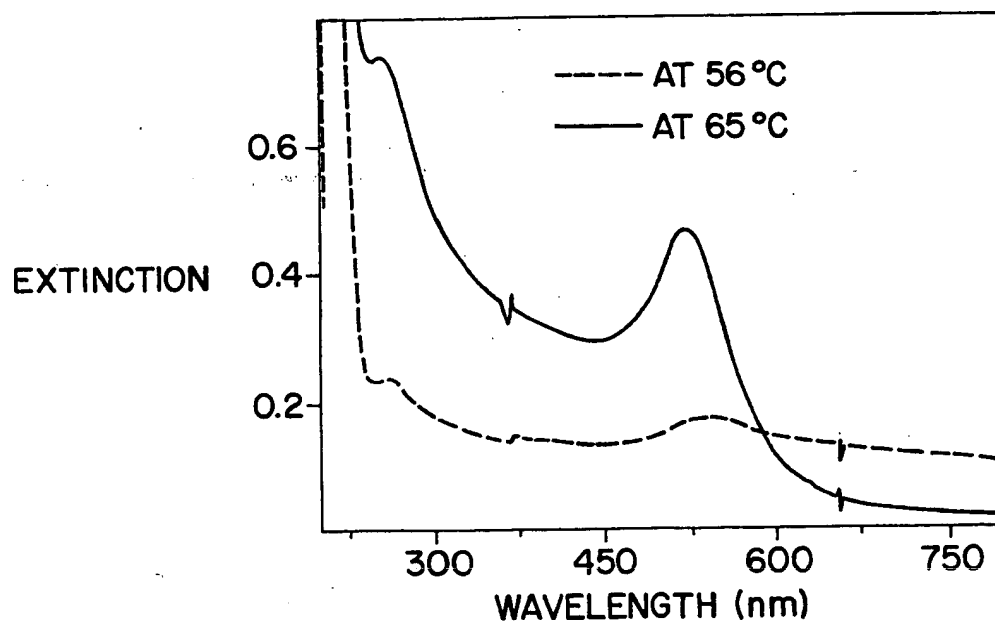
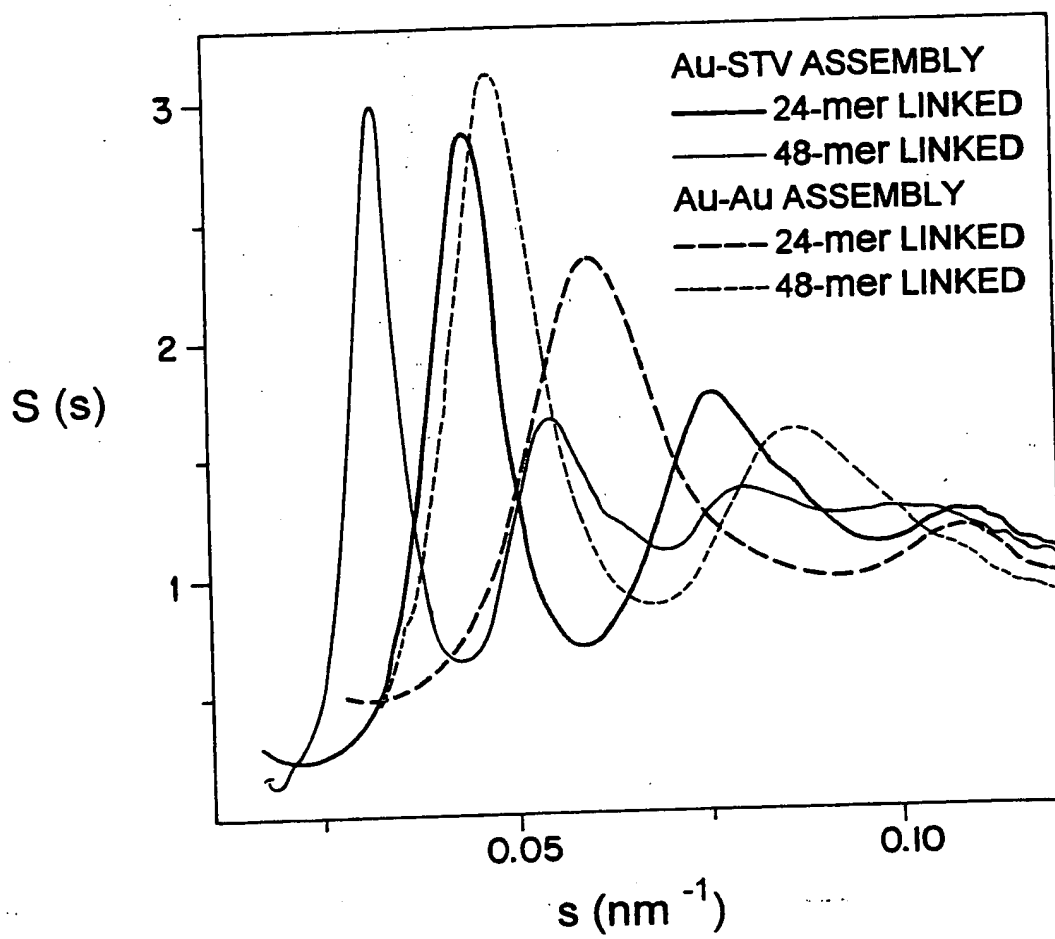
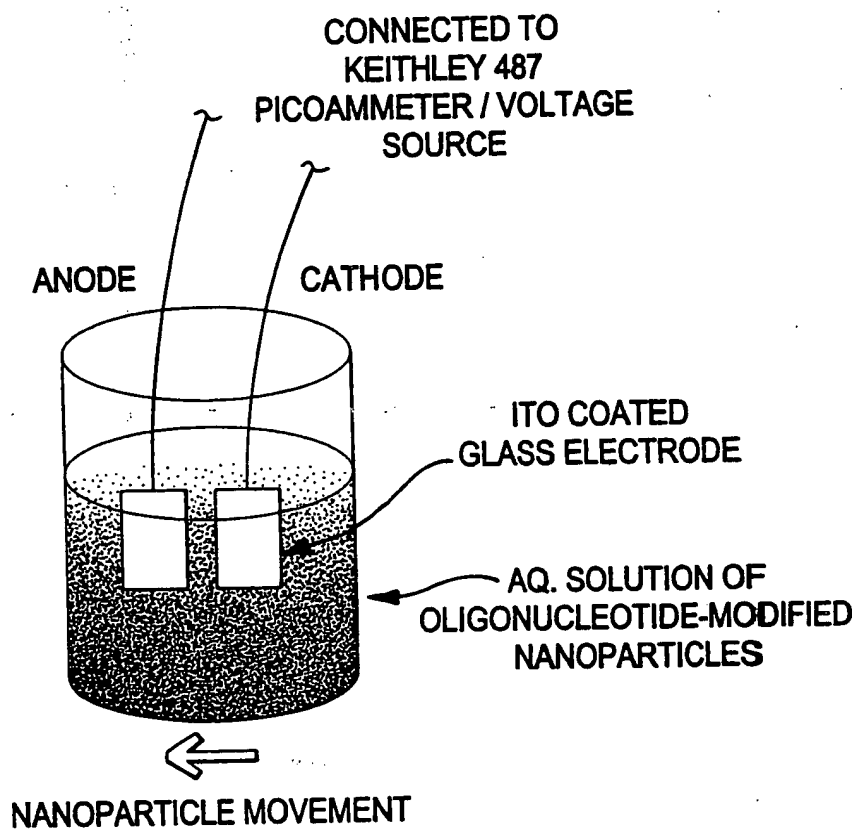


FIG. 59



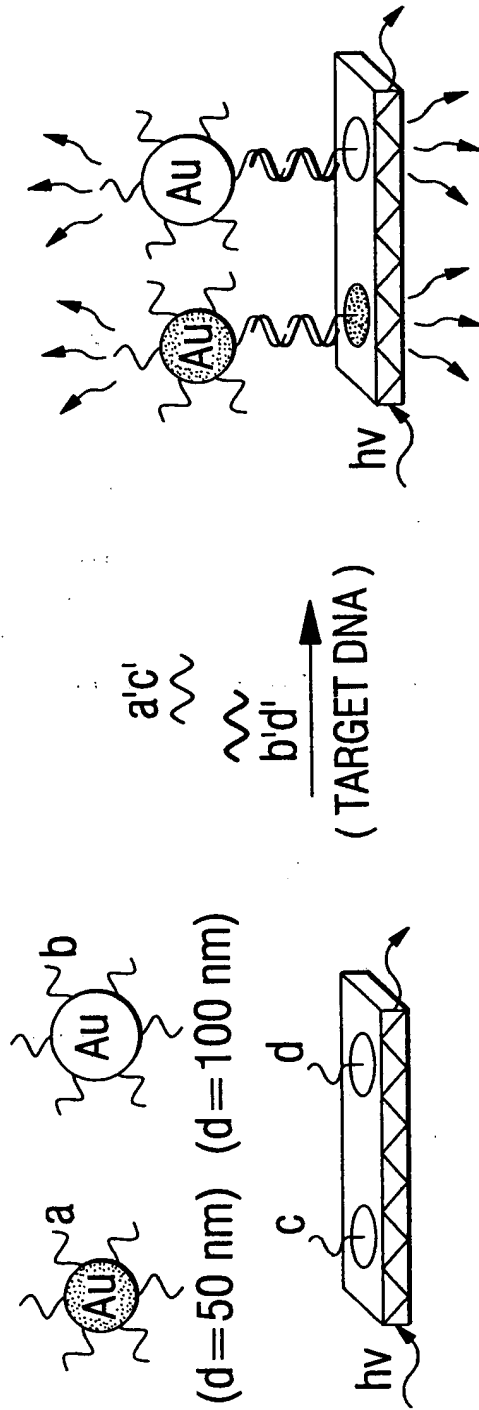
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FIG. 60

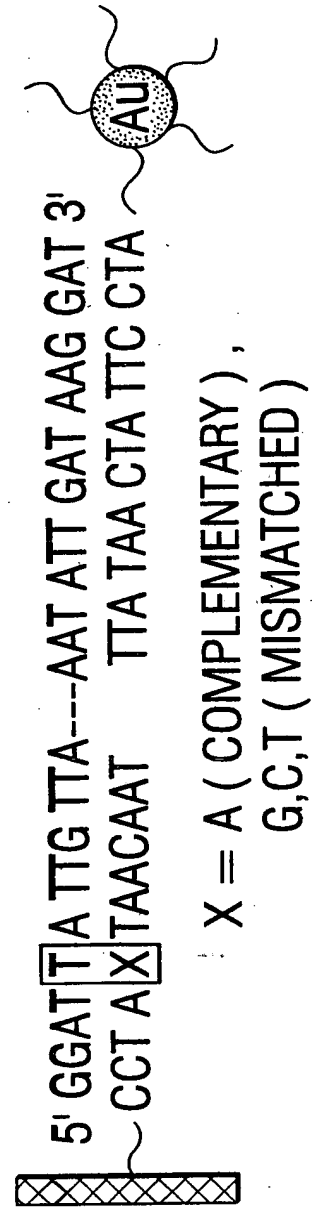




**FIG. 61A**



**FIG. 61B**



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## FIG. 62

Test for Target  
Sequence ***a'c'***

Test for Target  
Sequence ***b'd'***

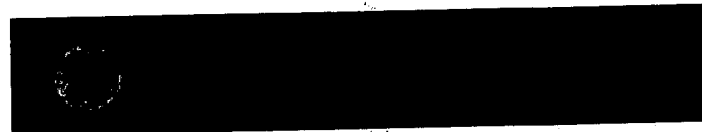
**A**



**B**



**C**



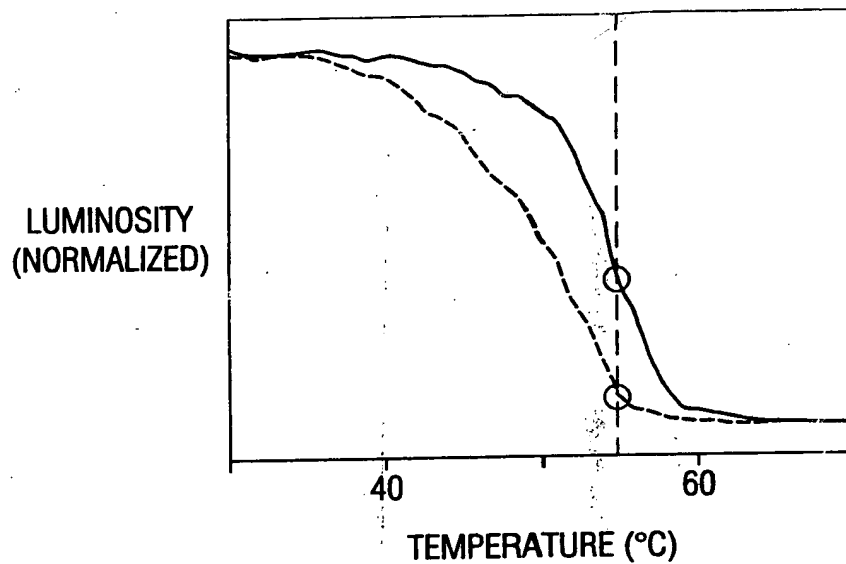
**D**



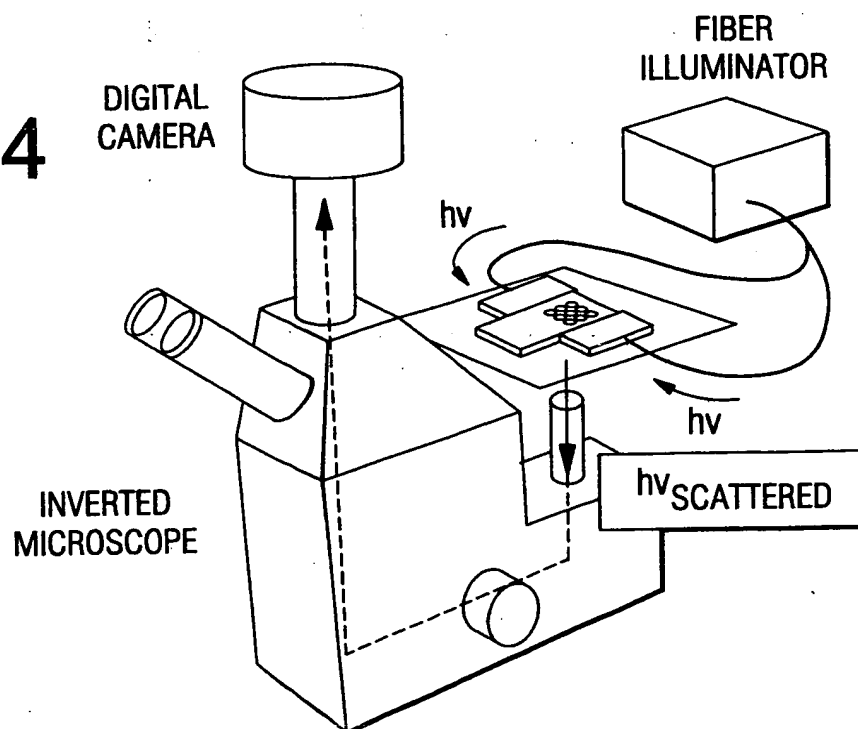


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**FIG. 63B**



**FIG. 64**



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FIG. 65A

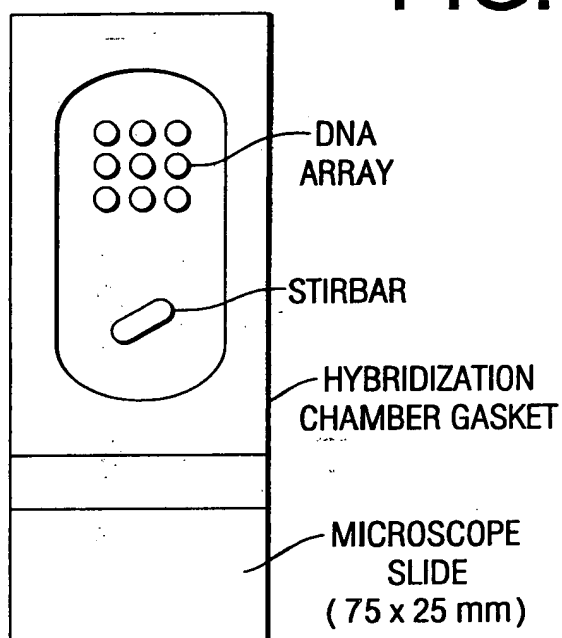
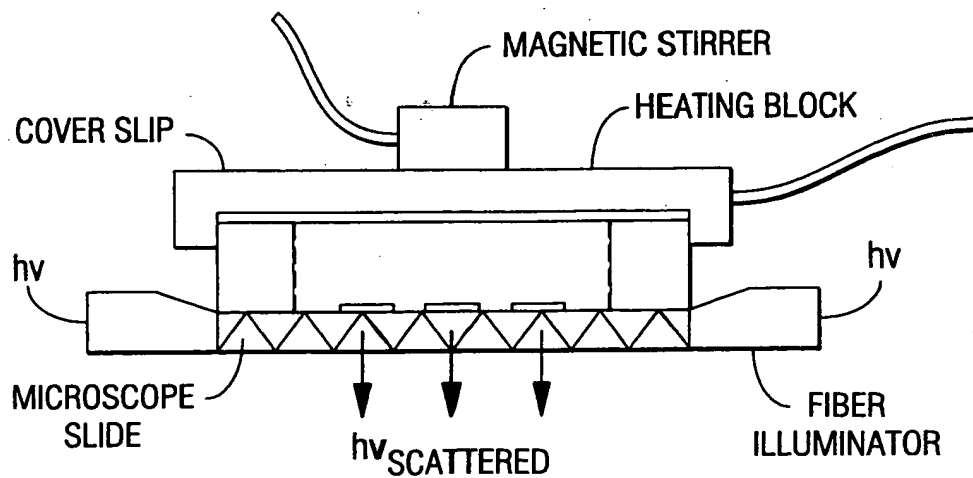
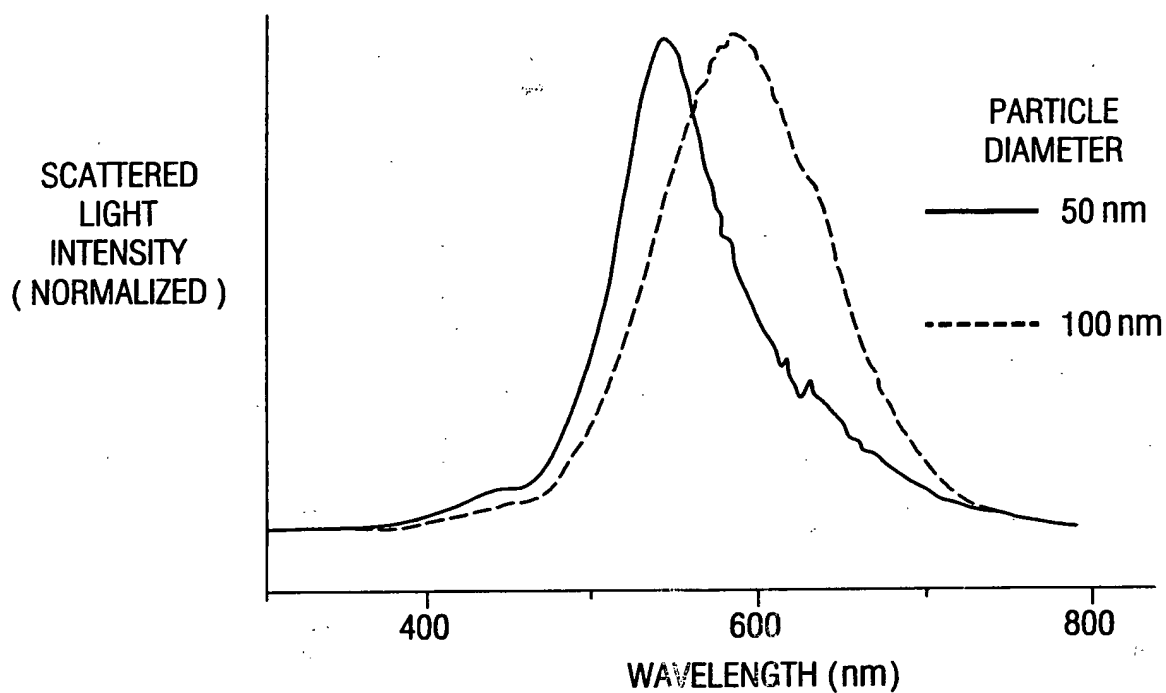


FIG. 65B



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# FIG. 66



# FIG. 67

